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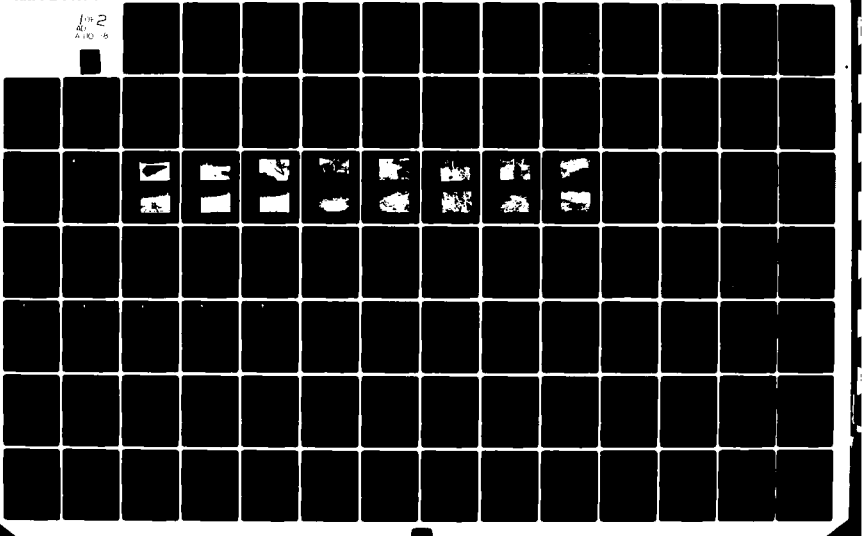

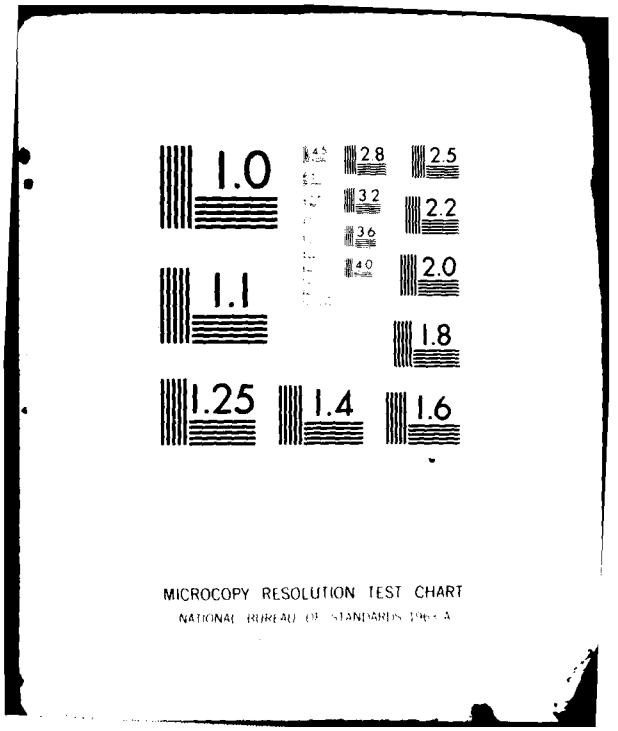
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LEVEL II

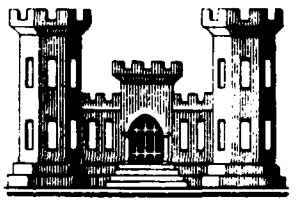
(1)

SUSQUEHANNA RIVER BASIN

MOE POND DAM

OTSEGO COUNTY, NEW YORK
INVENTORY No. NY 1269

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT, CORPS OF ENGINEERS
JULY 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analysis. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
MOE POND DAM
INVENTORY NO. NY 1269
SUSQUEHANNA RIVER BASIN
OTSEGO COUNTY, NEW YORK

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APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Moe Pond Dam

State Located: New York

County: Otsego

Watershed: Susquehanna River Basin

Watercourse: Willow Brook

Date of Inspection: April 9, 1981

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies that need to be evaluated and remedied.

Using the Corps of Engineers' screening criteria for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped by all storms exceeding 62 percent of the Probable Maximum Flood (PMF). Consequently, the spillway cannot adequately discharge the peak outflow from the full PMF; however, it will pass one half the PMF. Therefore, the spillway is adjudged to be inadequate.

It is recommended that the following additional investigations be performed by a registered professional engineer engaged by the owner:

1. The present embankment sections adjacent to the spillway represent a potential hazard to the dam with respect to possible erosion, piping and/or failure of the dam during high reservoir levels. Therefore, regrade this area to make the embankment section conform to the embankment cross sections elsewhere. In addition, adequately protect these sections from spillway outflows.

2. Investigate the seepage that was observed near the downstream toe of slope, including observation during high and low reservoir levels, evaluate the cause and recommend appropriate remedial measures.

It is recommended that within 3 months of the final approval date of this report, all of the additional investigations should be initiated and within 18 months, appropriate remedial measures

should be completed.

The following remedial measures should be completed within 12 months to correct existing deficiencies:

1. Fill and regrade the major depression between the drop structure and the spillway, as well as the other local depressions along the embankment crest and downstream slope to restore a uniform embankment cross section. Reestablish vegetative cover in these areas.

2. Clear the brush and trees from the embankment, including stump removal and backfilling, establish a vegetative cover, and cut grass and weeds on the embankment at least annually.

3. Flatten the grade at the top of the upstream slope and provide riprap or alternate slope protection as required between the crest and the existing riprap to prevent future slumping and erosion due to wave action.

4. Ensure the reservoir drain and its controls are operational.

5. Repair the deteriorated concrete of the spillway and outlet works endwall.

6. Fill in the woodchuck burrow and any other burrows observed on the embankment slopes.

7. Remove all logs, debris and other obstructions from the spillway area.

8. Develop and implement a flood warning and emergency evacuation plan to alert downstream residents in the event conditions occur which could result in the failure of the dam.

9. A program for regular maintenance should be developed and implemented.

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Submitted by: FLAHERTY GIAVARA ASSOCIATES, P.C.

Hugh C. Flaherty, P.E. & L.S.
Chairman of the Board
New York License No. 58508

Approved by: Col. W. M. Smith, Jr.
New York District Engineer

Date: 14 Sep 81

NATIONAL DAM SAFETY PROGRAM
PHASE I INSPECTION REPORT
MOE POND DAM
INVENTORY NO. NY 1269
SUSQUEHANNA RIVER BASIN
OTSEGO COUNTY, NEW YORK

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367. Flaherty Giavara Associates, P.C. has been retained by the New York District to inspect and report on selected dams in the State of New York. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of December 24, 1980 from W. M. Smith Jr., Colonel, Corps of Engineers. Contract No. DACW 51-81-C-0006 has been assigned by the Corps of Engineers for this work.

b. Purpose

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Moe Pond Dam consists of an earthfill embankment with a concrete spillway located near the left abutment. A concrete structure is located on the crest near the center of the dam. It appears to be a gate structure connecting to an 18 inch diameter cast iron pipe that outlets into the main discharge channel. The overall length of the dam is 222 feet. A plan, profile and section of the dam are shown in Appendix G.

The crest of the dam is 17.5 feet above the discharge channel and the crest width is approximately 12 feet. The upstream earthen slope varies from near vertical to 2 horizontal to 1 vertical from the crest to the reservoir level (a distance of 3± feet at the time of the visual inspection). Below the reservoir level, the upstream

slope appears to be much flatter and riprap-lined. The downstream slope is 2 horizontal to 1 vertical from the crest to a relatively flat berm about 9 to 10 feet below the crest. The downstream berm covers approximately the middle half of the dam and subsequently drops at slopes varying from 1.5 to 2 horizontal to 1 vertical, to the discharge channel, 7± feet below the berm.

Based on the 1934 drawings, the embankment consists of earthfill surrounding an interior concrete core. The core consists of a concrete wall with concrete fill on the downstream side. The wall begins several feet below the crest and extends below original ground surface to depths ranging from 4 to 15 feet to form a foundation cutoff. The core wall is 2 feet wide at its top and increases, in steps, to a 6 foot width at the bottom of the cutoff.

The spillway is approximately 15 feet wide, and consists of a concrete gravity section with no upstream or downstream retaining or abutment walls. The spillway discharge channel is about 7 feet wide and is excavated into earth about 2 feet. The channel retains this cross section and is gently sloping for a distance of 100± feet downstream of the spillway. Thereafter, it curves to the right and fans out over a 20 to 30 foot width creating several narrow, very shallow channels, all of which drop steeply into the main discharge channel.

b. Location

Moe Pond Dam is located off New York Route 28/80 approximately 1.3 miles northwest of the Village of Cooperstown in the Town of Otsego, New York. The dam is located at latitude north 42°-42.8' and longitude west 74°-56.7' on the U.S. Geological Survey 7.5 minute series topographic map "Cooperstown, New York". The Location Map on page i indicates where the dam is situated.

c. Size Classification

The maximum height of the dam is 27 feet and the maximum storage capacity is 295 acre-feet. Therefore, Moe Pond Dam is classified as a "Small" dam as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

There are seven roads (including New York State Routes 28 and 28/80), a railroad, numerous dwellings and buildings (Cooperstown) as well as historic Doubleday Field within the dam failure flood hazard area. Therefore, the dam is in the "High" hazard category as defined by the Recom-

mended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the State University of New York (SUNY) at Oneonta. The address and telephone number are as follows:

Owner

Contact: Dr. Williard N. Harman
Biology Department
State University College
Oneonta, New York 13820

Telephone: (607) 431-3703

f. Purpose

The primary purpose of this dam is the creation of an impoundment for the study of wildlife habitat.

g. Design and Construction History

The dam was designed by Wm. Carter Burnett in October, 1934 and constructed by the Leatherstocking Corporation of Cooperstown, New York in the mid 1930's.

h. Normal Operating Procedure

There are no regular operating procedures for this dam. The normal water level in the reservoir is maintained by the crest elevation of the spillway at approximately 1630.0 (NGVD).

1.3 PERTINENT DATA

a. Drainage Area (Square Miles)	0.26
b. Discharge at Dam Site (CFS)	
- Top of Dam	178
- Crest of Spillway	-
- Reservoir Drain Inlet	-
c. Elevations (NGVD - estimated)	
- Top of Dam	1632.5
- Crest of Spillway	1630.0
- Reservoir Drain Inlet	-

d. Reservoir Surface Area (Acres)

- Top of Dam	39
- Crest of Spillway	37
- Reservoir Drain Inlet	-

e. Storage (Acre-Feet)

- Top of Dam	295
- Crest of Spillway	200
- Reservoir Drain Inlet	-

f. Dam

- Type:	Earthfill with a concrete core and intermediate berm
- Length (Feet)	222
- Upstream Slope (H:V)	-
above reservoir	0.5-2.0:1
below reservoir	less than 2:1
- Downstream Slope (H:V)	2:1
- Crest Width (Feet)	12±

g. Spillway

- Type:	Stepped concrete weir and earthen discharge channel
- Length (Feet)	15
- Width (Feet)	5±
- Side Slopes (H:V)	vertical
- Channel Bottom Slope (Feet/Foot)	-
- Control:	None

h. Reservoir Drain

- Type:	18 inch diameter cast iron pipe (62 feet long)
- Control:	18 inch diameter slide gate located at centerline of dam

SECTION 2 - ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Moe Pond Dam is located on Willow Brook, a southeasterly flowing tributary to Otsego Lake which is the headwaters of the Susquehanna River. It is about 1.3 miles northwest of the Village of Cooperstown and lies in the Allegheny Plateau physiographic province of New York State. Local topography ranges from elevation 1600 in the streambed below the dam to elevation 1820 atop the hill directly east of Moe Pond.

Bedrock in the vicinity of the site consists of the Panther Mountain Formation belonging to Middle Devonian Hamilton group. This formation consists of medium to fine-bedded, medium to coarse-grained silty shales, siltstones and sandstones. Cross bedding, ripple marks and other high current sedimentary structures are abundant. This unit was probably deposited in a near-shore delta platform setting within the Catskill Delta Complex which prograded across the state from east to west.

Above the bedrock, some or all of the valley bottom may be mantled with glacial till, a heterogeneous mixture of clay, silt, sand, gravel and cobbles, deposited at the base of ice sheets which once covered the region. This in turn may be overlain by well-sorted sands and gravels deposited by glacial meltwater or subsidiary tributary streams.

b. Subsurface Conditions

There are no known records of subsurface explorations at the site of Moe Pond Dam.

2.2 DESIGN RECORDS

Moe Pond Dam was designed by Wm. Carter Burnett in October, 1934; however, no records were obtained concerning the original design of the dam.

2.3 CONSTRUCTION RECORDS

This dam was constructed in the mid 1930's by the Leatherstocking Corporation. A plan, profile and section of the dam dated October, 1934 and obtained from the Leatherstocking Corporation are included in Appendix G; however, no other construction records were available.

2.4 OPERATION RECORDS

No operation records were obtained for this dam.

2.5 EVALUATION OF DATA

The data presented herein was obtained primarily from the files of the New York State Department of Environmental Conservation (DEC) and from the Leatherstocking Corporation in Cooperstown, New York. This information appears to be reliable and adequate for the purposes of a Phase I Inspection Report.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

A visual inspection of Moe Pond Dam was conducted on April 9, 1981. The weather was mostly overcast and the temperature was 60± °F. At the time of the inspection, there was water flowing over the spillway weir (See Photo No. 10).

b. Dam

The earthfill embankment of the dam is generally in poor condition (See Photos No. 3, 4, 5, 6 and 7). Although somewhat obscured by heavy vegetative growth, there was no visible evidence of major lateral movement or settlement of the embankments. However, a significant depression was noted on the downstream side of the crest and active seepage was observed near the downstream toe.

The following specific items were noted:

1. A zone of active seepage was observed at the downstream toe to the right of the concrete endwall for the outlet works (See Photos No. 14 and 15). The flow rate was estimated at 1± gallons per minute (GPM) and the seepage appeared to be clear.

2. A depression was noted in the crest, downstream of the embankment centerline, midway between the gate structure and the spillway (See Photo No. 17). The depression is concave downstream. It measures about 13 feet along the downstream edge of the crest and cuts into the crest to form an arc that projects as much as 6 feet. The vertical displacement of this area ranges from 1 to 2 feet along the downstream edge of the crest to zero feet at the perimeter of the arc that projects into the crest. The cause of this depression is unknown, but it may have been due to erosion, sloughing or maintenance operations associated with cleanup of uprooted trees or other activities.

3. The crest of the dam (See Photo No. 3) contained several irregular depressions ranging up to 1 to 2 feet in diameter and about 6 to 12 inches deep. The upstream embankment slope above the reservoir level has experienced sloughing and erosion due to wave action such that they have a nearly vertical slope over most of the embankment length (See Photos No. 4 and 6).

4. There are no abutment or retaining walls between the spillway and the embankment (See Photo No. 10). The embankment narrows to a crest width of about 2 feet at the location of the spillway and drops to a depth of 6 inches below the top of the concrete spillway end sections (which in turn are about 12 inches below the embankment crest).

5. The slopes and crest of the embankment had a heavy cover of brush and trees ranging up to 18± inches in diameter (See Photos No. 3, 4, 5, 6, and 7). Trees were overhanging the upstream slope above the rock riprap and one had been uprooted (See Photo No. 6). One other uprooted tree was noted in the downstream slope area.

6. A significant accumulation of logs and other debris was observed on and immediately upstream and downstream of the spillway (See Photos No. 10 and 11).

7. Woodchuck and other animal burrows were observed in the downstream slope (See Photo No. 16).

8. No flow was evident from the 18 inch diameter cast iron outlet pipe even though the bottom two-thirds of the pipe was below the water level in the discharge channel (See Photo No. 9). The pipe was also "silted-up" to approximately one half its diameter.

c. Spillway

1. Spillway Weir

This broad-crested concrete weir is located at the left central portion of the embankment, and is 15 feet wide. The weir was in a state of disrepair in that the concrete has been allowed to deteriorate over the years, debris has collected at its entrance (See Photo No. 10) and a logjam has formed a short distance downstream (See Photos No. 10 and 11).

2. Spillway Discharge Channel

The 7± foot wide discharge channel is excavated into earth and discharges into the main discharge channel approximately 150 feet downstream of the spillway weir (See Photo No. 12). The channel has no erosion protection for either its bottom or its side slopes. Consequently, erosion is prevailing throughout (See Photos No. 11 and 12).

d. Reservoir Drain

1. Reservoir Drain and Outlet Works

The 18 inch diameter cast iron pipe has a submerged inlet, is controlled by a slide gate and valves (See Photo No. 8) and has a reinforced concrete endwall. The reservoir drain was in poor condition; the concrete endwall was severely deteriorated and the outlet pipe was nearly completely "silted-up" (See Photo No. 9). The reservoir drain was not operated during the inspection and it appeared it had not been operated in quite some time.

2. Main Discharge Channel

The earthen discharge channel has a bottom width of 10 feet, a length of approximately 150 feet and is heavily overgrown (See Photo No. 13).

e. Downstream Channel

The natural channel downstream of the dam has a width of 10± feet, a depth of 6 inches, and is in fair condition, being heavily overgrown. The channel is alluvial and its streambed consists of various gradations of gravel.

f. Reservoir - Storage Pool Area

The reservoir area is bordered by moderately sloping woodlands (See Photo No. 2). There is no significant probability of landslides into the storage pool affecting the safety of the dam. Sedimentation is not considered to be a factor in the the safety of this dam.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection revealed a number of deficiencies on this structure. The following items were noted:

a. Active seepage was observed at the downstream toe of slope.

b. A large depression was observed in the crest between the gate structure and the spillway.

c. The crest of the dam has several irregular depressions and the upstream embankment slope has sloughed and eroded from wave action.

d. There are no abutment or retaining walls between the spillway and embankment.

e. The slopes and crest of the embankment had a heavy cover of brush and trees.

f. A significant accumulation of logs and other debris was noted in proximity to the spillway.

g. The spillway discharge channel has experienced moderate erosion.

h. The concrete of the spillway weir and outlet works has deteriorated.

i. The reservoir drain is severely "silted-up".

j. The main discharge channel is heavily overgrown.

k. Woodchuck and other animal burrows were evident in the downstream slope.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface level is maintained by the crest of the spillway weir at approximately elevation 1630.0 (NGVD). No operational procedures are in effect at this time.

4.2 MAINTENANCE OF DAM

It appears that the only maintenance procedures in effect include mowing and brush cutting of the embankment crest, as well as the removal of uprooted trees.

4.3 WARNING SYSTEM

No warning system is presently in effect.

4.4 EVALUATION

Presently, no operation and only a few maintenance procedures are in effect for this dam. Therefore, a program for regular maintenance should be developed and implemented.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The dam is located in the Town of Otsego on Willow Brook, approximately 11,000 feet upstream of Otsego Lake in Cooperstown, New York, which is the headwaters of the Susquehanna River.

The watershed (shown on the Watershed Map on Page C-5 in Appendix C) consists of 168 acres (0.26 square miles) of hilly uplands with typical slopes of 10 percent. Land within the watershed is primarily undeveloped with extensive woodlands. There are no significant waterbodies or wetlands upstream from the dam.

The watercourse upon which the reservoir is located, is a small perennial stream with a typical flow width of 10 feet and a typical flow depth of 6 inches.

5.2 ANALYSIS CRITERIA

The purpose of the hydrologic/hydraulic analysis is to evaluate the spillway capacity and the potential for overtopping. The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers' HEC-1 Computer Model - Dam Safety Version. The procedure included determining the Probable Maximum Flood (PMF) runoff from the watershed and routing the inflow hydrograph through the impoundment to determine the outflow hydrograph. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated.

The initial rainfall loss was assumed to be 1.0 inches, and the uniform rainfall loss was assumed to be 0.1 inches per hour. In accordance with recommended guidelines of the Corps of Engineers, the Probable Maximum Precipitation (PMP) was 19.3 inches (24 hour duration, 200 square mile area).

The analysis was conducted for both the full PMF and for several fractional PMF conditions. The PMF inflow of 660 CFS was routed through the reservoir and the peak outflow was determined to be 503 CFS.

5.3 SPILLWAY CAPACITY

The total outlet capacity is the discharge from the spillway. The spillway consists of a 15 foot long broad-crested concrete weir with 2.5 feet of allowable elevation head and an earthen discharge channel.

The stage discharge data for the spillway was calculated for the stages tabulated below:

Stage (Feet)	Discharge Capacity (CFS)	Element of Structure
1630.0	0	Spillway Crest
1630.5	16	--
1631.0	45	--
1631.5	83	--
1632.0	127	--
1632.5	178	Top of Dam

The total spillway capacity at the top of dam is 178 CFS.

5.4 RESERVOIR CAPACITY

The storage capacity of the reservoir was calculated for the stages indicated below:

Stage (Feet)	Storage (Acre-Feet)	Storage (Inches of Runoff)
1630.0	200	14.29
1632.5	295	21.07

5.5 FLOODS OF RECORD

No data regarding flood levels was obtained for this dam.

5.6 OVERTOPPING POTENTIAL

The results of the HEC-1 DB computer analysis indicate that the crest of the dam is overtopped by all storms exceeding 62 percent of the PMF event. The PMF discharge rate of 503 cubic feet per second (CFS) would occur at a peak flood stage of 1633.1 feet, which is 0.6 feet above the crest of the dam.

The results of the analysis are tabulated below:

Flood Condition	Peak Inflow (CFS)	Peak Outflow (CFS)	Maximum Stage Elevation (NGVD)
0.5 PMF	330	135	1632.1
1.0 PMF	660	503	1633.1

5.7 EVALUATION

Using the Corps of Engineers' screening criteria for the initial review of spillway adequacy, it has been determined that the capacity of the spillway is not adequate to pass the full PMF, but it will pass one half the PMF; approximately 62 percent of the PMF can be safely passed before overtopping will occur. The PMF event would overtop the dam for a duration of 4 hours and the maximum depth of flow over the crest would be 0.6 feet. Therefore, the spillway is adjudged to be inadequate.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

There was no visible evidence of major settlement, lateral movement or overall structural instability of the dam during the site examination. Based on the conditions that were observed, there is no reason to question the static structural stability of the dam; however, both the active seepage and the continued erosion or sloughing of the upstream and downstream slopes near the crest represent a potential hazard to the overall integrity of the dam.

b. Design and Construction Data

There is no construction data to confirm the nature and actual physical properties of the earthfill in the embankment. However, the dam proportions are considered to be reasonable for the soils that were available at the site and therefore, the dam would be expected to have an adequate safety margin with respect to overall stability under static loading conditions.

c. Operating Records

No operating records were obtained for Moe Pond Dam.

d. Post Construction Changes

The 1934 drawings for Moe Pond Dam in Appendix G show a configuration for the dam and spillway that generally corresponds to the conditions observed during the visual examination of April 9, 1981, except for the following:

1. The observed embankment crest width was approximately 12 feet, whereas the crest width shown on the plans was 6 feet.

2. A berm has apparently been constructed on the downstream slope; this berm does not appear on the 1934 drawings.

3. The spillway shown on the drawings had a stepped concrete discharge apron; however, no such apron was constructed.

4. The reservoir drain which was noted during the inspection was an 18 inch diameter cast iron pipe; whereas, the plans showed a 3 foot square concrete box conduit.

6.2 STRUCTURAL STABILITY ANALYSIS

Available drawings show the concrete core wall and dimensions. As part of the present study, stability computations have been performed. Without the passive resistance of the material downstream of the spillway, the stability of the core wall section at the spillway would be unacceptable.

The stability analysis is presented in Appendix E. The results of the stability computations are summarized in the following table:

Loading Condition (Spillway Section)	[1]Factors of Safety: Overturning	[2]Sliding	[3]Location of Resultant Passing Through Base
1. Normal operating condition: water level at 1 foot above spillway crest	2.55	4.48	N/A
2. Maximum operating condition: water level at top of dam (2.5 feet above spillway crest	2.25	4.03	N/A
3. Full PMF condition: water level at El. 1633.0 (3.0 feet above spillway crest)	2.17	3.92	N/A
4. Ice loading condition: 5.0 Kips per foot acting at top of spillway	1.59	3.44	N/A

[1]These factors of safety indicate the ratio of moments resisting overturning to those moments causing overturning, and the ratio of forces resisting sliding to those causing sliding.

[2]As determined applying the friction-shear method

[3]Since stability of the cross section depends on passive soil pressure, this ratio is not meaningful.

The analysis indicates that with the consolidated material downstream of the spillway in place, the factors of safety for overturning were acceptable for all cases of loading except the ice loading condition.

Since the passive soil pressure is much greater than the active loadings, all factors of safety for sliding were within acceptable limits.

This analysis applies to a concrete core wall which is continuous across the spillway. It also assumes consolidated material providing passive resistance to movement; should this downstream material erode or be removed by excavation, static instability could result.

Moe Pond Dam is located in Seismic Zone 2, and in accordance with recommended Phase I guidelines does not require separate seismic analysis.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Condition

On the basis of the visual examination, there were no signs of impending structural failure or other conditions which would warrant urgent remedial action; however, a number of serious deficiencies were noted.

b. Adequacy of Information

Since there were no drawings available, the evaluation of this dam is based primarily on visual examination, limited measurements at the site, approximate hydraulic and hydrologic computations, and application of engineering judgement. The available information that was obtained is adequate for the purposes of a Phase I assessment.

c. Need for Additional Investigations

It is recommended that the following additional investigations be performed by a registered professional engineer engaged by the owner:

1. The present embankment sections adjacent to the spillway represent a potential hazard to the dam with respect to possible erosion, piping and/or failure of the dam during high reservoir levels. Therefore, regrade this area to make the embankment section conform to the embankment cross sections elsewhere. In addition, adequately protect these sections from spillway outflows.

2. Investigate the seepage that was observed near the downstream toe of slope, including observation during high and low reservoir levels, evaluate the cause and recommend appropriate remedial measures.

d. Urgency

It is recommended that within 3 months of the final approval date of this report, all of the additional investigations should be initiated and within 18 months, appropriate remedial measures should be completed. The corrective measures listed in Section 7.2 should be accomplished within 12 months of final approval.

7.2 RECOMMENDED MEASURES

It is considered important that the following items be accomplished in addition to any items required as a result of the additional investigations recommended in Section 7.1c:

a. Fill and regrade the major depression between the drop structure and the spillway, as well as the other local depressions along the embankment crest and downstream slope to restore a uniform embankment cross section. Reestablish vegetative cover in these areas.

b. Clear the brush and trees from the embankment, including stump removal and backfilling, establish a vegetative cover, and cut grass and weeds on the embankment at least annually.

c. Flatten the grade at the top of the upstream slope and provide riprap or alternate slope protection as required between the crest and the existing riprap to prevent future slumping and erosion due to wave action.

d. Ensure the reservoir drain and its controls are operational.

e. Repair the deteriorated concrete of the spillway and outlet works endwall.

f. Fill in the woodchuck burrow and any other burrows noted in the embankment slopes.

g. Remove all logs, debris and other obstructions from the spillway area.

h. Develop and implement a flood warning and emergency evacuation plan which would be implemented to alert the downstream residents in the event conditions occur which could result in the failure of the dam.

i. A program for regular maintenance should be developed and implemented.

APPENDIX A

PHOTOGRAPHS

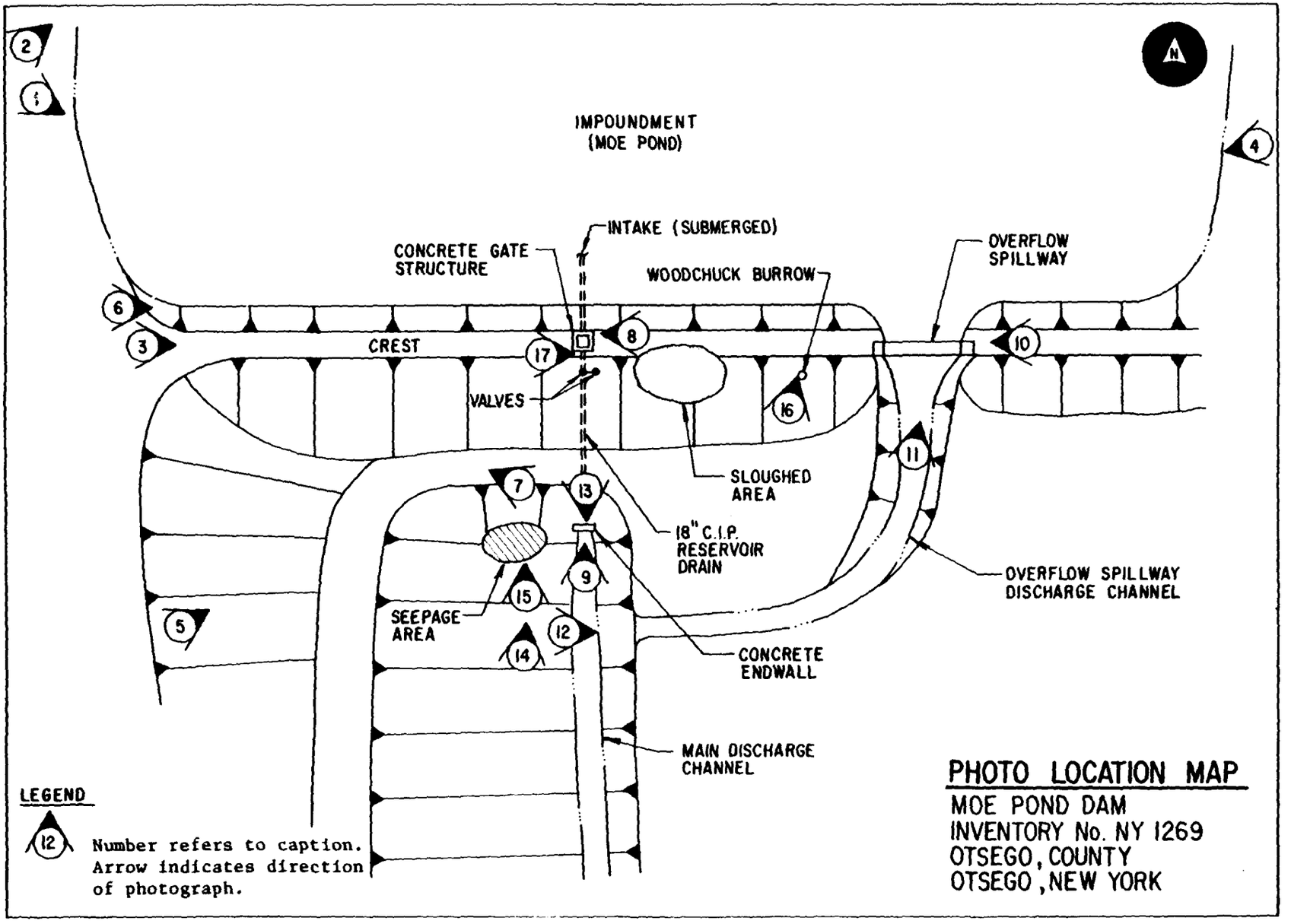


PHOTO LOCATION MAP

MOE POND DAM
INVENTORY No. NY 1269
OTSEGO, COUNTY
OTSEGO, NEW YORK

PHOTO #2: Overview of impoundment

PHOTO #3: Crest of dam looking toward left abutment

PHOTO #4: Overview of upstream face of dam

PHOTO #5: Overview of downstream face of dam

PHOTO #6: Upstream face of dam

PHOTO #7: Downstream face of dam

PHOTO #8: Gate structure and valves

PHOTO #9: Outlet works

PHOTO #10: Crest of spillway

PHOTO #11: Spillway discharge channel looking upstream

PHOTO #12: Spillway discharge channel exit into main discharge channel

PHOTO #13: Downstream channel conditions

PHOTO #14: Seepage located to the right of outlet works

PHOTO #15: Close-up of seepage

PHOTO #16: Woodchuck burrow on downstream slope

PHOTO #17: Depression in downstream slope between gate structure and spillway

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam: Moe Pond Dam

Fed. I.D. #: NY 1269 DEC Dam No.: ---

River Basin: Susquehanna

Location: Town: Otsego County: Otsego

Stream Name: Willow Brook

Tributary of: Otsego Lake (Susquehanna River)

Latitude (N): 42° - 42.8' Longitude (W): 74° - 56.7'

Type of Dam: Earthfill embankment with a concrete overflow spillway

Hazard Category: High

Date(s) of Inspection: April 9, 1981

Weather Conditions: Overcast, 60° ± F.

Reservoir Level at Time of Inspection: Elevation 1630.1 ± (NGVD)

b. Inspection Personnel: T. L. Ward & R. A. Criscuolo of Flaherty Giavara Associates P. C.; J. J. Rixner of Haley & Aldrich, Inc.; B. McL. Whittingham of Salmon Associates.

c. Persons Contacted (Including Address & Phone No.)

Dr. Williard N. Harman	John Hohenfeldt, Building Manager
Biology Department State University College	Biological Field Station State University College
Oneonta, New York 13820	Cooperstown, New York 13326
(607) 431-3703	(607) 547-8778

d. History:

Date Constructed: Mid 1930's Date(s) Reconstructed: ---

Designer: Wm. Carter Burnett

Constructed By: Leatherstocking Corporation

Owner: State University of New York (SUNY) at Oneonta

2) Embankment

a. Characteristics

(1) Embankment Material Unknown

(2) Cutoff Type Core wall

(3) Impervious Core Concrete core wall

(4) Internal Drainage System None observed

(5) Miscellaneous No comments

b. Crest

(1) Vertical Alignment Fair; surface generally irregular; rutting in footpath; surface erosion and 12± foot wide depression between gate structure and spillway

(2) Horizontal Alignment Good; substantially straight

(3) Surface Cracks None observed except at uprooted tree

(4) Miscellaneous Surface irregular, depressions up to approximately 1.0 foot deep; grass, brush, small trees and footpath

c. Upstream Slope

(1) Slope (Estimate - V:H) 1:3

(2) Undesirable Growth or Debris, Animal Burrows Numerous trees and shrubs; uprooted tree adjacent to right abutment; no animal burrows were noted

(3) Sloughing, Subsidence or Depressions Some surface erosion noted; shallow surface sloughing observed, apparently from wave action

(4) Slope Protection Blocky to flat riprap noted in reservoir

(5) Surface Cracks or Movement at Toe None evident

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2.5

(2) Undesirable Growth or Debris, Animal Burrows Brush, grass and trees 18 to 24 inches in diameter; numerous woodchuck burrows

(3) Sloughing, Subsidence or Depressions Surface generally irregular; surface erosion and 12± foot wide depression between gate structure and spillway

(4) Surface Cracks or Movement at Toe None apparent; however, slope is very irregular

(5) Seepage Wet area observed to the right of outlet works at approximately the same elevation

(6) External Drainage System (Ditches, Trenches, Blanket) None apparent

(7) Condition Around Outlet Structure Reinforced concrete endwall was severely deteriorated; outlet pipe was almost completely "silted-in"

(8) Seepage Beyond Toe None evident

e. Abutments - Embankment Contact

Left: Good condition

Right: Good condition

(1) Erosion at Contact None observed

(2) Seepage Along Contact None evident

3) Drainage System

a. Description of System Broad-crested concrete weir and earthen discharge channel leading to the main discharge channel

b. Condition of System Poor; concrete of the spillway weir is deteriorated; debris has collected at the spillway entrance; a logjam has formed just downstream from the spillway weir

c. Discharge from Drainage System Earthen discharge channel leading to main discharge channel

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Peizometers, Etc.)

None observed

5) Reservoir

a. Slopes Moderately sloping woodlands

b. Sedimentation None observed

c. Unusual Conditions Which Affect Dam None noted

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Numerous dwellings and buildings (Cooperstown), historic Doubleday Field, a railroad and seven roads (including New York State Routes 28 and 80) are within the dam failure flood hazard area

b. Seepage, Unusual Growth None observed

c. Evidence of Movement Beyond Toe of Dam None evident

d. Condition of Downstream Channel Fair; channel is unprotected against erosion and heavily overgrown

7) Spillway(s) (Including Discharge Conveyance Channel)

Spillway and discharge channel

a. General Spillway and discharge channel handle all flows

b. Condition of Overflow Spillway Poor;concrete is deteriorated; debris has collected at the entrance to the spillway; a logjam has formed just downstream of the spillway

c. Condition of Emergency Spillway Not applicable

d. Condition of Discharge Conveyance Channel Fair condition; heavily overgrown and no erosion protection

8) Reservoir Drain/Outlet

Type: Pipe X Conduit _____ Other _____

Material: Concrete _____ Metal Cast iron Other _____

Size: 18 inch Length 62 feet

Invert Elevations: Entrance Unknown (submerged) Exit Unknown (silted)

Physical Condition (Describe): Unobservable _____

Material: Unknown

Joints: Unknown Alignment Unknown

Structural Integrity: Appears to be good

Hydraulic Capability: Poor;pipe is severely silted

Means of Control: Gate Slide gate Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Uncontrolled _____

Present Condition (Describe): Unknown, slide gate was not operated during the inspection

9) Structural

a. Concrete Surfaces Concrete of the spillway crest and of the endwall has spalled and exposed some reinforcing; concrete of the gate structure is in good condition

b. Structural Cracking No evidence of any structural cracks

c. Movement - Horizontal & Vertical Alignment (Settlement) None observed

d. Junctions with Abutments or Embankments Fair; however, there are no spillway retaining walls

e. Drains - Foundation, Joint, Face None evident

f. Water Passages, Conduits, Sluices Poor condition; endwall is severely deteriorated, pipe is badly silted and spillway is clogged with debris

g. Seepage or Leakage No signs of seepage or leakage

h. Joints - Construction, etc. Good condition

i. Foundation Inaccessible

j. Abutments See 9) d. above

k. Control Gates 18 inch diameter slide gate controls the reservoir drain

l. Approach & Outlet Channels Not applicable

m. Energy Dissipators (Plunge Pool, etc.) None evident

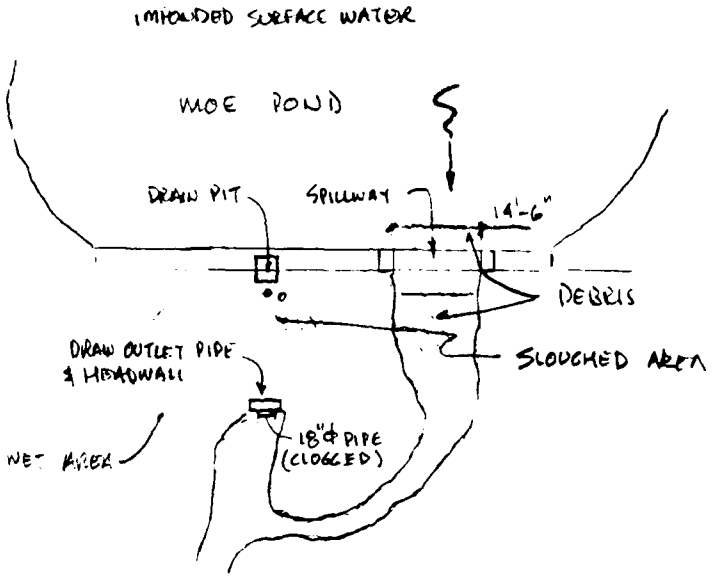
n. Intake Structures Unknown

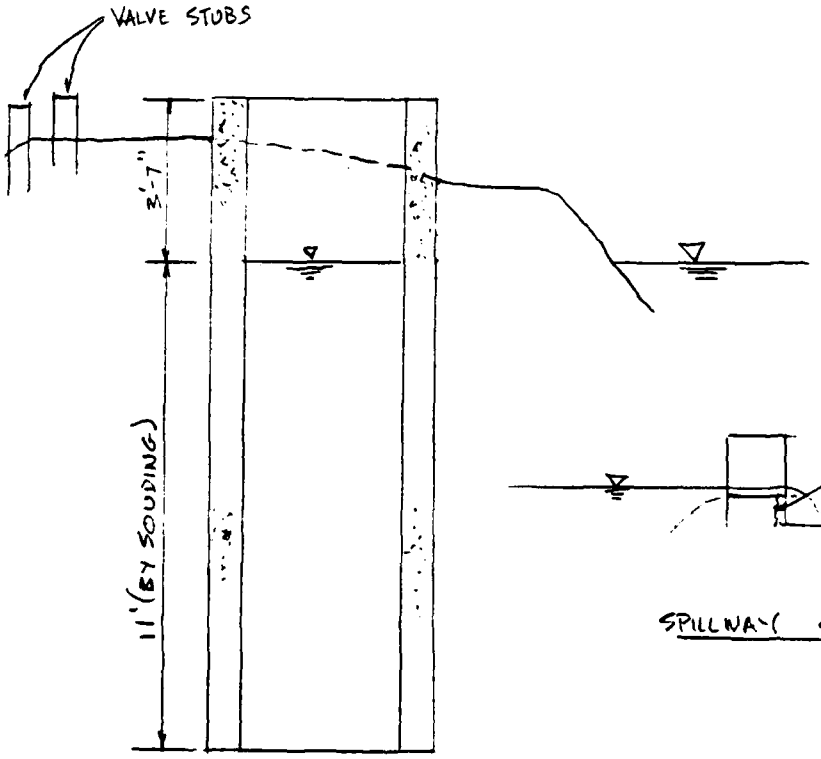
o. Stability Appears to be stable

p. Miscellaneous No comments

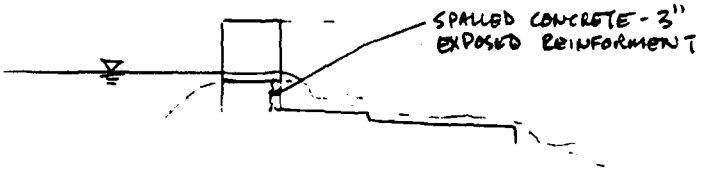
10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition None observed





DRAIN PIT SECTION



SPILLWAY SECTION

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1632.5	39	295
2) Design High Water (Max. Design Pool)	--	--	--
3) Emergency Spillway Crest	--	--	--
4) Pool Level with Flashboards	--	--	--
5) Principal Spillway Crest	1630.0	37	200

DISCHARGES:

	Volume (cfs)
1) Average Daily	Unknown
2) Overflow Spillway @ Maximum High Water (Top of Dam)	178
3) Emergency Spillway @ Design High Water	--
4) Principal Spillway @ Emergency Spillway Crest	--
5) Low Level Outlet @ Principal Spillway Crest	32
6) Total (of all facilities) @ Maximum High Water	210
7) Maximum Known Flood	Unknown
8) At Time of Inspection	1 ±

CREST: ELEVATION: 1632.5 (NGVD)

Type: Earthen embankment with a concrete core wall

Width: 12± feet Length: 222 feet

Spillover: Concrete overflow spillway weir

Location: Left center section of embankment

SPILLWAY:

PRINCIPAL		EMERGENCY
1630.0 (NGVD)	Elevation	
Broad-crested weir	Type	
5± feet	Width	
	Type of Control	
Weir	Uncontrolled	
--	Controlled	
None	Type: (Flashboards; gate)	
One	Number	
15 foot weir	Size/Length	
Concrete	Invert Material	
Continuously	Anticipated Length of Operating Service	
Unknown	Chute Length	
Unknown	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

Type: _____

Location: _____

Records:

Date Unknown

Max. Reading Unknown

FLOOD WATER CONTROL SYSTEM:

Warning System None in effect

Method of Controlled Releases (mechanisms) Manually controlled slide gate to drain the impoundment

DRAINAGE AREA: 168 acres = 0.26 square miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Rural, wildlife preserve for conservation and study

Terrain - Relief: Rolling uplands

Surface - Soil: Glacial till

Runoff Potential (existing or planned extensive alterations to existing surface or subsurface conditions)

Primarily woodlands with scattered open fields; glacial till soils; average watershed slope is 10 ± percent

Potential Sedimentation problem areas (natural or man-made; present or future)

None

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the reservoir perimeter:

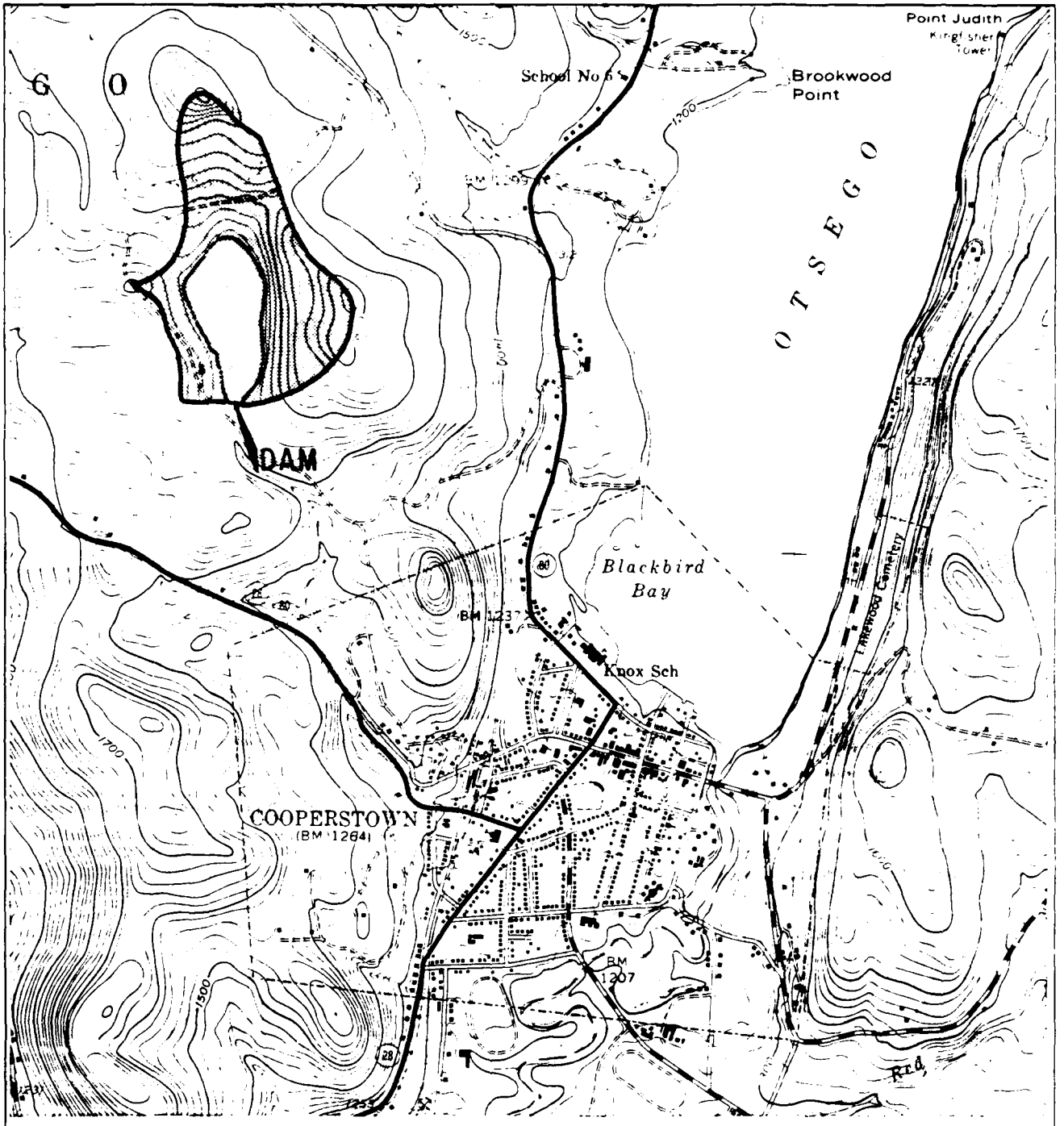
Location: None

Elevation:

Reservoir:

Length @ Maximum Pool 2,300 ± feet = 0.4 miles (Miles)

Length of Shoreline (@ Spillway Crest) 5,500 ± feet = 1.0 miles (Miles)



WATERSHED MAP

MOE POND DAM
INVENTORY No. NY 1269

SUSQUEHANNA RIVER BASIN
OTSEGO COUNTY
OTSEGO, NEW YORK

N

0 2000 4000

SCALE IN FEET

FLAHERTY · GIAVARA ASSOCIATES, P.C.

CALCULATIONS

PROJECT Corps Dams
NJ 1269

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN CONN 06510/203/789-1260

SHEET NO. 1 OF
BY RAC DATE 4-29-81
CHK'D. BY TLW DATE 5-1-81

Watershed Data For HEC 1 Snyder Hydrograph

1) Time To Peak

$L = 4400$ ft $= 0.83$ miles
$L_c = 1900$ ft $= 0.36$ miles
$C_t = 2.0$ for average Slopes

$$T_p = C_t (L L_c)^{0.3}$$
$$= 2.0 (0.83 \times 0.36)^{0.3} = 1.39 \text{ Hours}$$

$$t_r = \frac{t_p}{5.5} = \frac{1.39}{5.5} = 0.25 \quad \text{USE } t_R = 0.5$$

$$t_{pR} = t_p + 0.25 (t_R - t_r)$$
$$= 1.39 + 0.25 (0.5 - 0.25) = 1.45 \text{ Hours}$$

2) % Impervious

1 House @ $= 1000$ ft^2

1000 ft^2 $=$ 0.02 AC

$$\frac{0.02}{1680} = 0.01\ \%$$

3) Watershed Area

1680 acres $/ 640 = 0.26$ mi^2

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1280

4) Rainfall Data (From Hydrometeorological Report No. 33).

24 Hour Duration PMP = 19.3 inches for 200 Square Miles

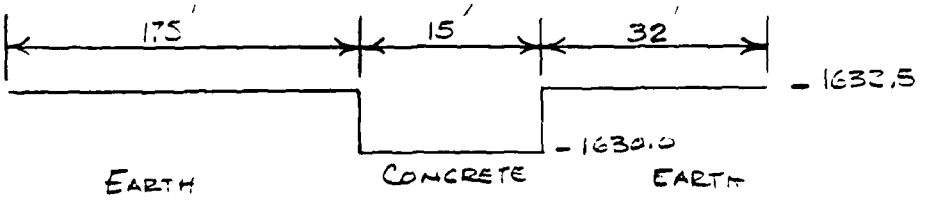
Duration (Hours)	Adj. Factor %
6	111
12	122
24	133
48	143

PROJECT Ford Dam
NJ 255

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203/789-1260

SHEET NO. 5 OF
BY RAC DATE 4-28-81
CHK'D. BY TLW DATE 5-1-81

Stage Discharge Data

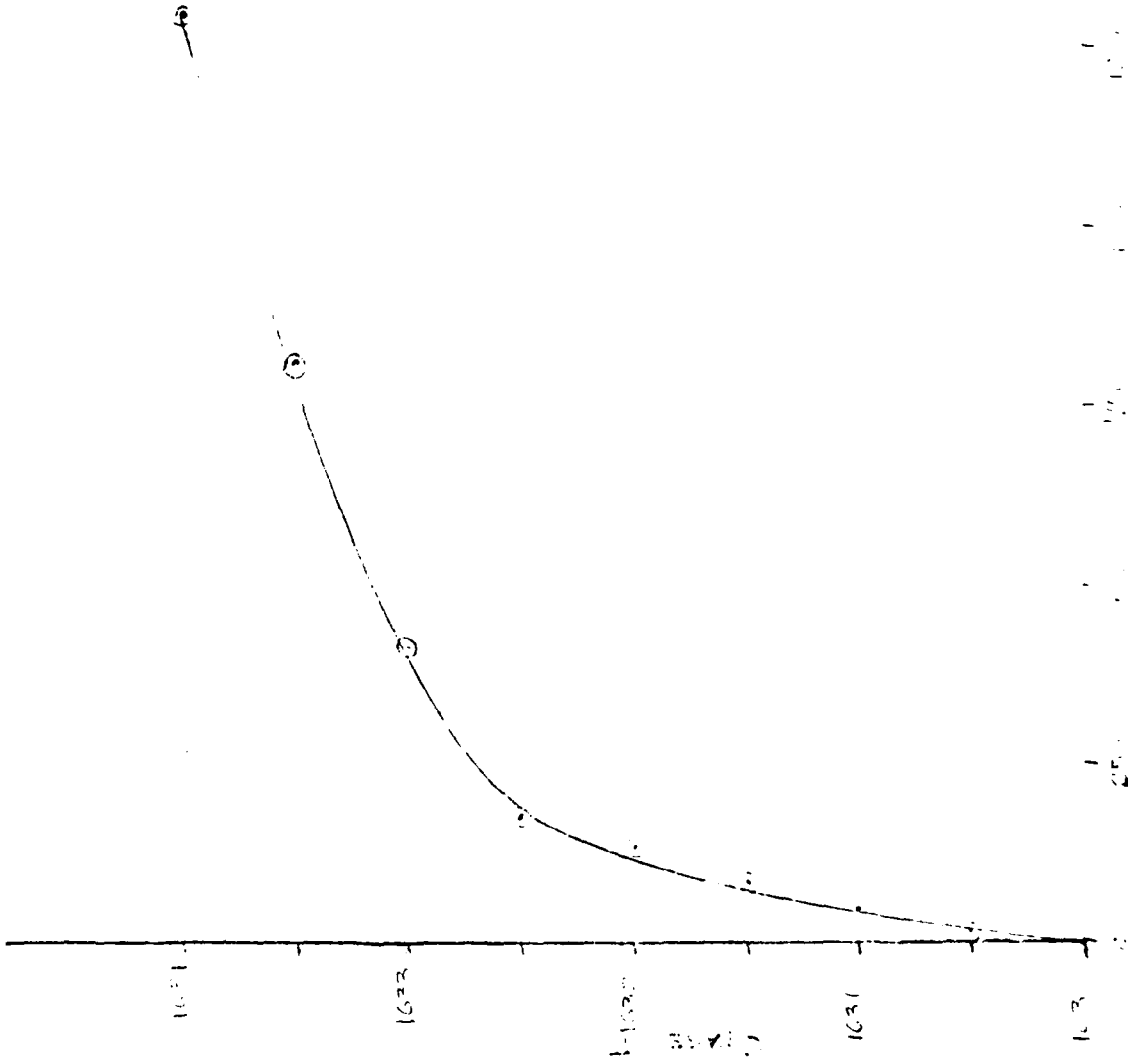


Stage	$Q = 3(15)H^{1.5}$	$Q = 2.5(200)H^{1.5}$	Discharge
1630.0	—		0
1630.5	$3(15)(.5)^{1.5}$		15.9
1631.0	$3(15)(1)$		45.0
1631.5	$3(15)(1.5)^{1.5}$		82.7
1632.0	$3(15)(2)^{1.5}$		127.3
1632.5	$3(15)(2.5)^{1.5}$	—	177.9
1633.0	$3(15)(3)^{1.5}$	$2.5(207)(.5)^{1.5}$	416.8
1633.5	$3(15)(3.5)^{1.5}$	$2.5(207)(1)$	812.2
1634.0	$3(15)(4)^{1.5}$	$2.5(207)(1.5)^{1.5}$	1310.7

PROJECT _____

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203 789 1280

SHEET NO. ___ OF ___
BY ___ DATE ___
CHK'D BY ___ DATE ___



PROJECT

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203/789-1260

SHEET NO. _____ OF _____
BY _____ DATE _____
CHK'D. BY TLW DATE _____

HEC-1 FLOOD HYDROGRAPH COMPUTATIONS

```
FLAHERTY GIAVARA ASSOCIATES, P.C.
 **********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************
      1                A1   NATIONAL DAM INSPECTION PROGRAM, PHASE I REPORT, CORPS OF ENGINEERS - NEW YORK DISTRICT
      2                A2   DAM INVENTORY NO  1269, MOE POND DAM, OTSEGO COUNTY, NEW YORK, APRIL 29, 1981
      3                A3   PREPARED BY FLAHERTY GIAVARA ASSOCIATES, P.C., ONE COLUMBUS PLAZA, NEW HAVEN, CONNECTICUT
      4                B    120       0      30       0       0       0       0       2       0       0
      5                B1     5
      6                J       1       9       1
      7                J1  0.50    0.55    0.60    0.61    0.62    0.63    0.64    0.65    1.00
      8                K       0       1                       0       0       1       0
      9                K1   INFLOW HYDROGRAPH - SNYDER METHOD
     10                M       1       1    0.26                       0       0                       1
     11                P       0    19.3     111     122     133     143
     12                T                                                       1     0.1                  0.0001
     13                W    1.45    0.63
     14                X    -2.0   -0.10     1.5
     15                K       1       1                       0       0       1       0
     16                K1   RESERVOIR ROUTING - MODIFIED PULS METHOD
     17                Y                                       1       1
     18                Y1      1                                               0      -1
     19                Y41630.0  1630.5  1631.0  1631.5  1632.0  1632.5  1633.0  1633.5  1634.0
     20                Y5      0    15.9    45.0    82.7   127.3   177.9   233.8   294.7   360.0
     21                $A   36.7    45.9    55.1
     22                $E1630.0  1640.0  1630.0
     23                $$1630.0
     24                $D1632.5     2.5     1.5     207
     25                K      99
                                  PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
                                          RUNOFF HYDROGRAPH AT          1
                                          ROUTE HYDROGRAPH TO           1
                                          END OF NETWORK

 **********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************

 RUN   DATE: 9/02/
       TIME: 11:43 AM

                        NATIONAL DAM INSPECTION PROGRAM, PHASE I REPORT, CORPS OF ENGINEERS - NEW YORK DISTRICT
                        DAM INVENTORY NO. 1269, MOE POND DAM, OTSEGO COUNTY, NEW YORK, APRIL 29, 1981
                        PREPARED BY FLAHERTY GIAVARA ASSOCIATES, P.C.; ONE COLUMBUS PLAZA, NEW HAVEN, CONNECTICUT

                                                JOB SPECIFICATION
                      NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                     120        0       30        0        0        0        0        2        0        0
                                                JOPER      NWT    LROPT    TRACE
                                                    5        0        0        0

                                MULTI-PLAN ANALYSES TO BE PERFORMED
```

NPLAN= 1 NRTIO= 9 LRTIO= 1

RTIOS= 0.50 0.55 0.60 0.61 0.62 0.63 0.64 0.65 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH - SNYDER METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDO	IUHO	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.26	0.00	0.26	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.30	111.00	122.00	133.00	143.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.45 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.90

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 3.57 AND R= 2.28 INTERVALS

UNIT HYDROGRAPH 14 END-OF-PERIOD ORDINATES, LAG= 1.44 HOURS, CP= 0.63 VOL= 1.00

13. 44. 70. 70. 50. 32. 21. 13. 8. 5.
3. 2. 1. 1.

END-OF-PERIOD FLOW

MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.30	1	0.00	0.00	0.00	0.	1.02	6.30	61	0.14	0.09	0.05	3
1.01	1.00	2	0.00	0.00	0.00	0.	1.02	7.00	62	0.14	0.09	0.05	7
1.01	1.30	3	0.00	0.00	0.00	0.	1.02	7.30	63	0.14	0.09	0.05	13
1.01	2.00	4	0.00	0.00	0.00	0.	1.02	8.00	64	0.14	0.09	0.05	19
1.01	2.30	5	0.00	0.00	0.00	0.	1.02	8.30	65	0.14	0.09	0.05	23
1.01	3.00	6	0.00	0.00	0.00	0.	1.02	9.00	66	0.14	0.09	0.05	26
1.01	3.30	7	0.00	0.00	0.00	0.	1.02	9.30	67	0.14	0.09	0.05	28
1.01	4.00	8	0.00	0.00	0.00	0.	1.02	10.00	68	0.14	0.09	0.05	29
1.01	4.30	9	0.00	0.00	0.00	0.	1.02	10.30	69	0.14	0.09	0.05	29
1.01	5.00	10	0.00	0.00	0.00	0.	1.02	11.00	70	0.14	0.09	0.05	30
1.01	5.30	11	0.00	0.00	0.00	0.	1.02	11.30	71	0.14	0.09	0.05	30
1.01	6.00	12	0.00	0.00	0.00	0.	1.02	12.00	72	0.14	0.09	0.05	30
1.01	6.30	13	0.01	0.00	0.01	0.	1.02	12.30	73	0.86	0.81	0.05	40
1.01	7.00	14	0.01	0.00	0.01	0.	1.02	13.00	74	0.86	0.81	0.05	71
1.01	7.30	15	0.01	0.00	0.01	0.	1.02	13.30	75	1.03	0.98	0.05	123
1.01	8.00	16	0.01	0.00	0.01	0.	1.02	14.00	76	1.03	0.98	0.05	181
1.01	8.30	17	0.01	0.00	0.01	0.	1.02	14.30	77	1.29	1.24	0.05	232
1.01	9.00	18	0.01	0.00	0.01	0.	1.02	15.00	78	1.29	1.24	0.05	278
1.01	9.30	19	0.01	0.00	0.01	0.	1.02	15.30	79	1.56	1.51	0.05	323

1.01	10.00	20	0.01	0.00	0.01	0.	1.02	16.00	80	4.95	4.90	0.05		410
1.01	10.30	21	0.01	0.00	0.01	0.	1.02	16.30	81	1.20	1.15	0.05		552
1.01	11.00	22	0.01	0.00	0.01	0.	1.02	17.00	82	1.20	1.15	0.05		660
1.01	11.30	23	0.01	0.00	0.01	0.	1.02	17.30	83	0.94	0.89	0.05		654
1.01	12.00	24	0.01	0.00	0.01	0.	1.02	18.00	84	0.94	0.89	0.05		565
1.01	12.30	25	0.06	0.00	0.06	0.	1.02	18.30	85	0.08	0.03	0.05		466
1.01	13.00	26	0.06	0.00	0.06	0.	1.02	19.00	86	0.08	0.03	0.05		366
1.01	13.30	27	0.08	0.00	0.08	0.	1.02	19.30	87	0.08	0.03	0.05		264
1.01	14.00	28	0.08	0.00	0.08	0.	1.02	20.00	88	0.08	0.03	0.05		178
1.01	14.30	29	0.10	0.00	0.10	0.	1.02	20.30	89	0.08	0.03	0.05		117
1.01	15.00	30	0.10	0.00	0.10	0.	1.02	21.00	90	0.08	0.03	0.05		79
1.01	15.30	31	0.12	0.00	0.12	0.	1.02	21.30	91	0.08	0.03	0.05		65
1.01	16.00	32	0.37	0.13	0.25	2.	1.02	22.00	92	0.08	0.03	0.05		62
1.01	16.30	33	0.09	0.04	0.05	6.	1.02	22.30	93	0.08	0.03	0.05		60
1.01	17.00	34	0.09	0.04	0.05	11.	1.02	23.00	94	0.08	0.03	0.05		57
1.01	17.30	35	0.07	0.02	0.05	14.	1.02	23.30	95	0.08	0.03	0.05		55
1.01	18.00	36	0.07	0.02	0.05	13.	1.03	0.00	96	0.08	0.03	0.05		53
1.01	18.30	37	0.01	0.00	0.01	11.	1.03	0.30	97	0.00	0.00	0.00		51
1.01	19.00	38	0.01	0.00	0.01	9.	1.03	1.00	98	0.00	0.00	0.00		49
1.01	19.30	39	0.01	0.00	0.01	6.	1.03	1.30	99	0.00	0.00	0.00		47
1.01	20.00	40	0.01	0.00	0.01	4.	1.03	2.00	100	0.00	0.00	0.00		45
1.01	20.30	41	0.01	0.00	0.01	3.	1.03	2.30	101	0.00	0.00	0.00		43
1.01	21.00	42	0.01	0.00	0.01	2.	1.03	3.00	102	0.00	0.00	0.00		41
1.01	21.30	43	0.01	0.00	0.01	1.	1.03	3.30	103	0.00	0.00	0.00		40
1.01	22.00	44	0.01	0.00	0.01	1.	1.03	4.00	104	0.00	0.00	0.00		38
1.01	22.30	45	0.01	0.00	0.01	1.	1.03	4.30	105	0.00	0.00	0.00		37
1.01	23.00	46	0.01	0.00	0.01	1.	1.03	5.00	106	0.00	0.00	0.00		35
1.01	23.30	47	0.01	0.00	0.01	1.	1.03	5.30	107	0.00	0.00	0.00		34
1.02	0.00	48	0.01	0.00	0.01	1.	1.03	6.00	108	0.00	0.00	0.00		32
1.02	0.30	49	0.06	0.01	0.05	1.	1.03	6.30	109	0.00	0.00	0.00		31
1.02	1.00	50	0.06	0.01	0.05	1.	1.03	7.00	110	0.00	0.00	0.00		30
1.02	1.30	51	0.06	0.01	0.05	1.	1.03	7.30	111	0.00	0.00	0.00		29
1.02	2.00	52	0.06	0.01	0.05	1.	1.03	8.00	112	0.00	0.00	0.00		28
1.02	2.30	53	0.06	0.01	0.05	2.	1.03	8.30	113	0.00	0.00	0.00		27
1.02	3.00	54	0.06	0.01	0.05	2.	1.03	9.00	114	0.00	0.00	0.00		25
1.02	3.30	55	0.06	0.01	0.05	2.	1.03	9.30	115	0.00	0.00	0.00		24
1.02	4.00	56	0.06	0.01	0.05	2.	1.03	10.00	116	0.00	0.00	0.00		23
1.02	4.30	57	0.06	0.01	0.05	2.	1.03	10.30	117	0.00	0.00	0.00		23
1.02	5.00	58	0.06	0.01	0.05	2.	1.03	11.00	118	0.00	0.00	0.00		22
1.02	5.30	59	0.06	0.01	0.05	2.	1.03	11.30	119	0.00	0.00	0.00		21
1.02	6.00	60	0.06	0.01	0.05	2.	1.03	12.00	120	0.00	0.00	0.00		20
									SUM	22.08	18.38	3.70		7080.
										(561.)	(467.)	(94.)	(	200.48)

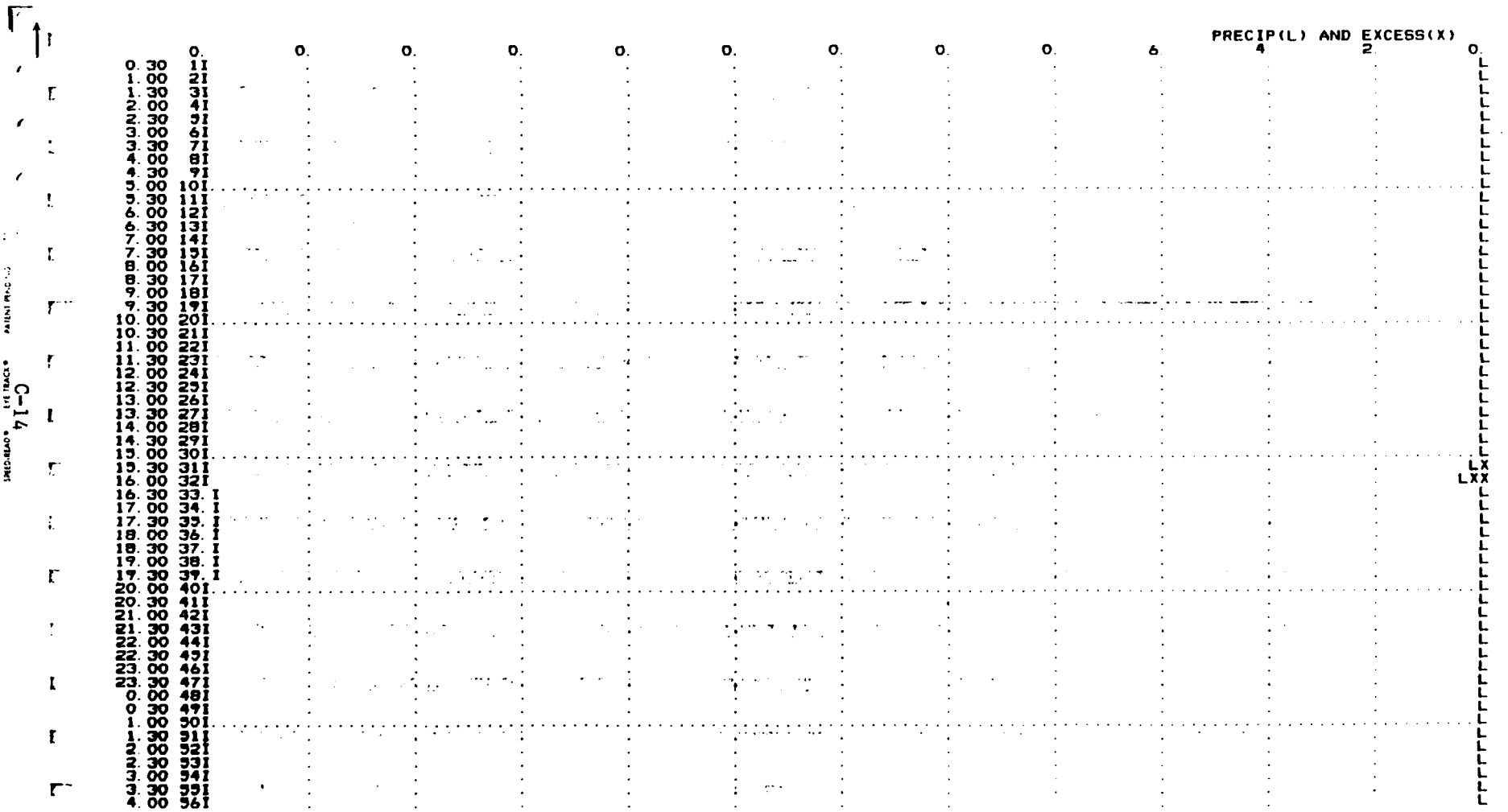
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	660.	413.	141.	59.	7081.
CMS	19.	12.	4.	2.	201.
INCHES		14.76	20.12	21.11	21.11
MM		374.87	511.07	536.26	536.26
AC-FT		205.	279.	293.	293.
THOUS CU M		252.	344.	361.	361.

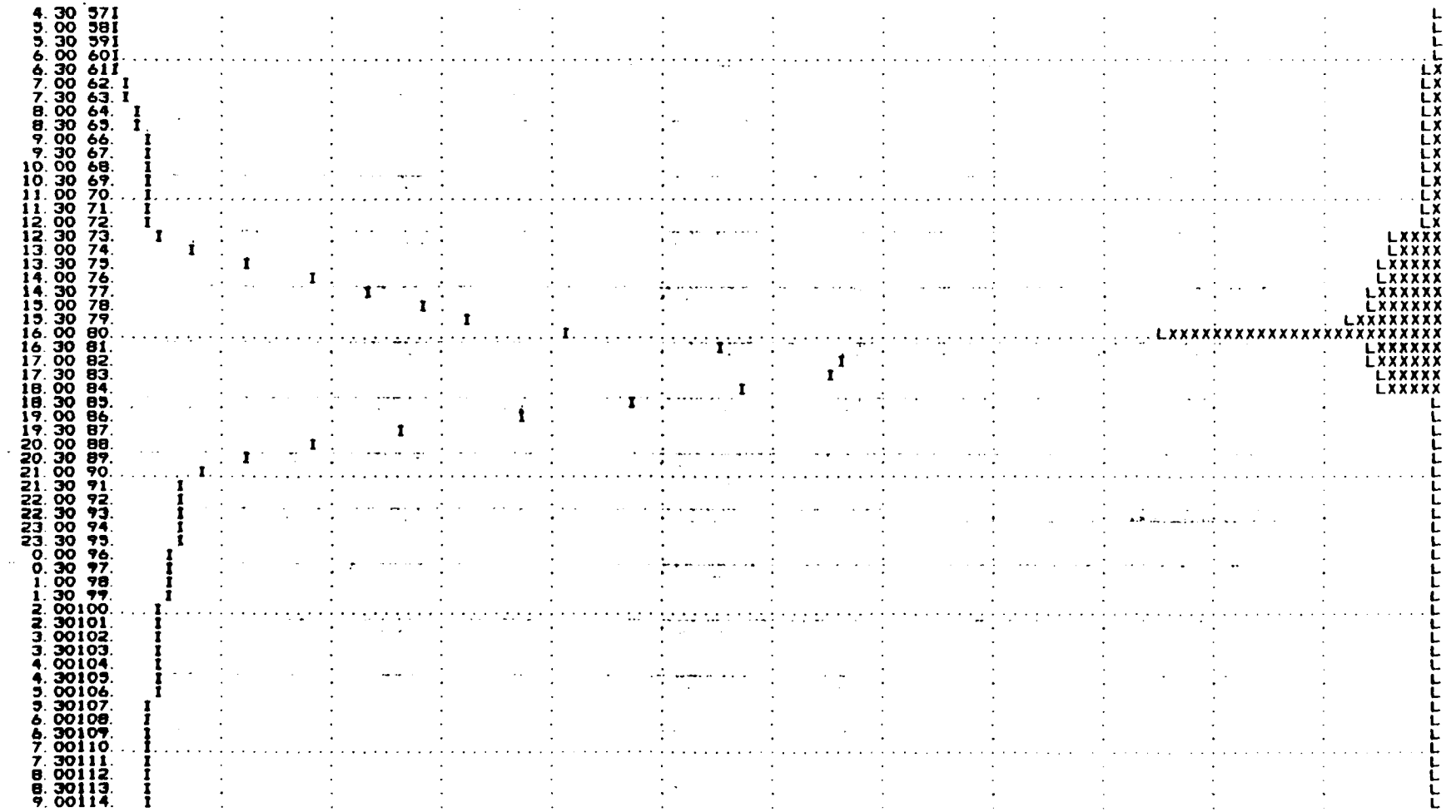
OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0. 100. 200. 300. 400. 500. 600. 700. 0. 0. 0. 0. 0


PRECIP(L) AND EXCESS(X)
0. 0. 0. 0. 0. 0. 0. 0. 0. 6 4 2 0
0.30 11
1.00 21
1.30 31
2.00 41
2.30 51
3.00 61
3.30 71
4.00 81
4.30 91
5.00 101
5.30 111
6.00 121
6.30 131
7.00 141
7.30 151
8.00 161
8.30 171
9.00 181
9.30 191
10.00 201
10.30 211
11.00 221
11.30 231
12.00 241
12.30 251
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 33. I
17.00 34. I
17.30 35. I
18.00 36. I
18.30 37. I
19.00 38. I
19.30 39. I
20.00 401
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
0 30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 551
4.00 561



```
 9.30115. I
10.00116. I
10.30117. I
11.00118. I
11.30119. I
12.00120. I
```

OVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	3.	6.	7.	7.	6.	4.	3.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	6.	9.	12.	13.	14.	14.	15.	15.
15.	15.	20.	35.	62.	90.	116.	139.	161.	205.
276.	330.	327.	283.	233.	183.	132.	89.	59.	37.
32.	31.	30.	29.	28.	26.	25.	24.	23.	22.
22.	21.	20.	19.	18.	18.	17.	16.	16.	15.
14.	14.	13.	13.	12.	12.	11.	11.	10.	10.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	330.	206.	70.	30.	3941.
CMS	9.	6.	2.	1.	100.
INCHES		7.38	10.06	10.56	10.56
MM		187.44	255.54	268.13	268.13
AC-FT		102.	139.	146.	146.
THOUS CU M		126.	172.	180.	180.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	3.	6.	8.	7.	6.	5.	4.	2.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	7.	10.	13.	14.	15.	16.	16.	16.
17.	17.	22.	39.	68.	99.	127.	153.	177.	226.
304.	363.	359.	311.	257.	201.	145.	98.	64.	43.
36.	34.	33.	32.	30.	29.	28.	27.	26.	25.
24.	23.	22.	21.	20.	19.	19.	18.	17.	16.
16.	15.	15.	14.	13.	13.	12.	12.	11.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	363.	227.	77.	32.	3895.
CMS	10.	6.	2.	1.	110.
INCHES		8.12	11.07	11.61	11.61
MM		206.18	281.09	294.94	294.94
AC-FT		113.	153.	161.	161.
THOUS CU M		139.	189.	199.	199.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	4.	7.	8.	8.	7.	5.	4.	3.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	8.	11.	14.	16.	17.	17.	18.	18.
18.	18.	24.	42.	74.	108.	139.	167.	194.	246.
331.	396.	392.	339.	280.	220.	159.	107.	70.	47.
39.	37.	36.	34.	33.	32.	30.	29.	28.	27.
26.	25.	24.	23.	22.	21.	20.	19.	19.	18.
17.	17.	16.	15.	15.	14.	14.	13.	12.	12.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	396.	248.	84.	35.	4249.
CMS	11.	7.	2.	1.	120.
INCHES		8.86	12.07	12.67	12.67
MM		224.92	306.64	321.76	321.76
AC-FT		123.	167.	176.	176.
THOUS CU M		151.	206.	217.	217.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	4.	7.	8.	8.	7.	5.	4.	3.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	8.	12.	14.	16.	17.	18.	18.	18.
18.	19.	24.	43.	75.	110.	141.	169.	197.	250.
337.	403.	399.	345.	285.	223.	161.	108.	72.	48.
39.	38.	36.	35.	34.	32.	31.	30.	29.	27.
26.	25.	24.	23.	22.	21.	21.	20.	19.	18.
18.	17.	16.	16.	15.	14.	14.	13.	13.	12.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	403.	252.	86.	36.	4320.
CMS	11.	7.	2.	1.	122.
INCHES		9.00	12.27	12.88	12.88
MM		228.67	311.75	327.12	327.12
AC-FT		125.	170.	178.	178.
THOUS CU M		154.	210.	220.	220.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	4.	7.	9.	8.	7.	6.	4.	3.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	8.	12.	14.	16.	17.	18.	18.	19.
19.	19.	25.	44.	76.	112.	144.	172.	200.	254.
342.	409.	405.	350.	289.	227.	164.	110.	73.	49.
40.	39.	37.	36.	34.	33.	31.	30.	29.	28.
27.	26.	25.	24.	23.	22.	21.	20.	19.	19.
18.	17.	16.	16.	15.	15.	14.	13.	13.	12.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	409.	256.	87.	37.	4390.
CMS	12.	7.	2.	1.	124.
INCHES		9.15	12.47	13.09	13.09
MM		232.42	316.86	332.48	332.48
AC-FT		127.	173.	181.	181.
THOUS CU M		156.	213.	224.	224.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

0	0	0.	0.	0.	0.	0.	0.	0.	0.
0	0	0.	0.	0.	0.	0.	0.	0.	0.
0	0	0.	0	0.	0.	0.	0	0	0
0	1	4.	7.	9.	8.	7.	6.	4.	3.
2	1	1.	1.	1.	1.	1.	1.	1.	1.
1	1	1.	1.	1.	1.	1.	1.	1.	1.
2	4	8.	12.	15.	16.	17.	18.	19.	19.
19	19.	25.	45.	78.	114.	146.	175.	203.	259.
348	416.	412.	356.	294.	231.	166.	112.	74.	50.
41	39.	38.	36.	35.	33.	32.	31.	29.	28.
27	26.	25.	24.	23.	22.	21.	20.	20.	19.
18	17.	17.	16.	15.	15.	14.	14.	13.	13.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	416.	260.	89.	37.	4461.
CMS	12.	7.	3.	1.	126.
INCHES		9.30	12.68	13.30	13.30
MM		236.17	321.97	337.84	337.84
AC-FT		129.	176.	184.	184.
THOUS CU M		159.	217.	227.	227.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 7

0	0	0.	0.	0.	0.	0.	0.	0.	0.
0	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0	1.	4.	7.	9.	8.	7.	6.	4.	3.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	4.	8.	12.	15.	17.	18.	18.	19.	19.
19.	19.	25.	45.	79.	116.	148.	178.	206.	263.
353.	423.	418.	362.	298.	234.	169.	114.	75.	50.
41.	40.	38.	37.	35.	34.	32.	31.	30.	29.
28.	27.	25.	24.	23.	23.	22.	21.	20.	19.
18.	18.	17.	16.	16.	15.	14.	14.	13.	13.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	423.	264.	90.	38.	4532.
CMS	12.	7.	3.	1.	128.
INCHES		9.45	12.88	13.51	13.51
MM		239.92	327.08	343.21	343.21
AC-FT		131.	178.	187.	187.
THOUS CU M		161.	220.	231.	231.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 8

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	4.	7.	9.	9.	7.	6.	4.	3.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	5.	8.	12.	15.	17.	18.	19.	19.	19.
20.	20.	26.	46.	80.	117.	151.	181.	210.	267.
359.	429.	425.	367.	303.	238.	172.	115.	76.	51.
42.	40.	39.	37.	36.	34.	33.	32.	30.	29.
28.	27.	26.	25.	24.	23.	22.	21.	20.	19.
19.	18.	17.	17.	16.	15.	15.	14.	14.	13.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	429.	268.	91.	38.	4603.
CMS	12.	8.	3.	1.	130.
INCHES		9.59	13.08	13.72	13.72
MM		243.67	332.19	348.57	348.57
AC-FT		133.	181.	190.	190.
THOUS CU M		164.	224.	235.	235.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 9

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2.	6.	11.	14.	13.	11.	9.	6.	4.
3.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	2.	2.
3.	7.	13.	19.	23.	26.	28.	29.	29.	30.
30.	30.	40.	71.	123.	181.	232.	278.	323.	410.
552.	660.	654.	569.	466.	366.	264.	178.	117.	79.
65.	62.	60.	57.	55.	53.	51.	49.	47.	45.
43.	41.	40.	38.	37.	35.	34.	32.	31.	30.
29.	28.	27.	25.	24.	23.	23.	22.	21.	20.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	660.	413.	141.	59.	7081.
CMS	19.	12.	4.	2.	201.
INCHES		14.76	20.12	21.11	21.11
MM		374.87	511.07	536.26	536.26
AC-FT		205.	279.	293.	293.
THOUS CU M		252.	344.	361.	361.

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HYDROGRAPH ROUTING

RESERVOIR ROUTING - MODIFIED PULS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT

			1	0	0	0.000	0.000	0.000	0.	-1
STAGE	1630.00	1630.50	1631.00	1631.50	1632.00	1632.50	1633.00	1633.50	1634.00	
FLOW	0.00	15.90	45.00	82.70	127.30	177.90	233.80	294.70	360.00	

SURFACE AREA=	37.	46.	55.
CAPACITY=	0.	412.	916.
ELEVATION=	1630.	1640.	1650.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1630.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1632.5	2.5	1.5	207.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	2.	2.	2.	3.	3.	4.
4.	4.	5.	6.	7.	10.	13.	18.	26.	36.
49.	69.	91.	111.	124.	132.	135.	132.	126.	119.
112.	104.	98.	91.	85.	80.	76.	72.	68.	65.
61.	58.	55.	52.	50.	47.	45.	43.	41.	40.
38.	37.	35.	34.	32.	31.	30.	29.	28.	27.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	3.	3.	4.	4.
5.	5.	6.	7.	8.	11.	15.	20.	25.	31.
39.	49.	60.	68.	74.	77.	78.	77.	75.	72.
68.	65.	62.	60.	57.	55.	53.	51.	49.	47.
45.	44.	42.	41.	39.	38.	37.	36.	35.	34.
33.	32.	31.	30.	29.	28.	27.	27.	26.	25.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0

1630.0	1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.1	1630.1	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.7	1630.8
1631.1	1631.3	1631.6	1631.8	1632.0	1632.1	1632.1	1632.1	1632.0	1631.9
1631.8	1631.7	1631.7	1631.6	1631.5	1631.5	1631.4	1631.4	1631.3	1631.3
1631.2	1631.2	1631.1	1631.1	1631.1	1631.0	1631.0	1631.0	1630.9	1630.9
1630.9	1630.9	1630.8	1630.8	1630.8	1630.8	1630.7	1630.7	1630.7	1630.7

PEAK OUTFLOW IS 135. AT TIME 43.50 HOURS

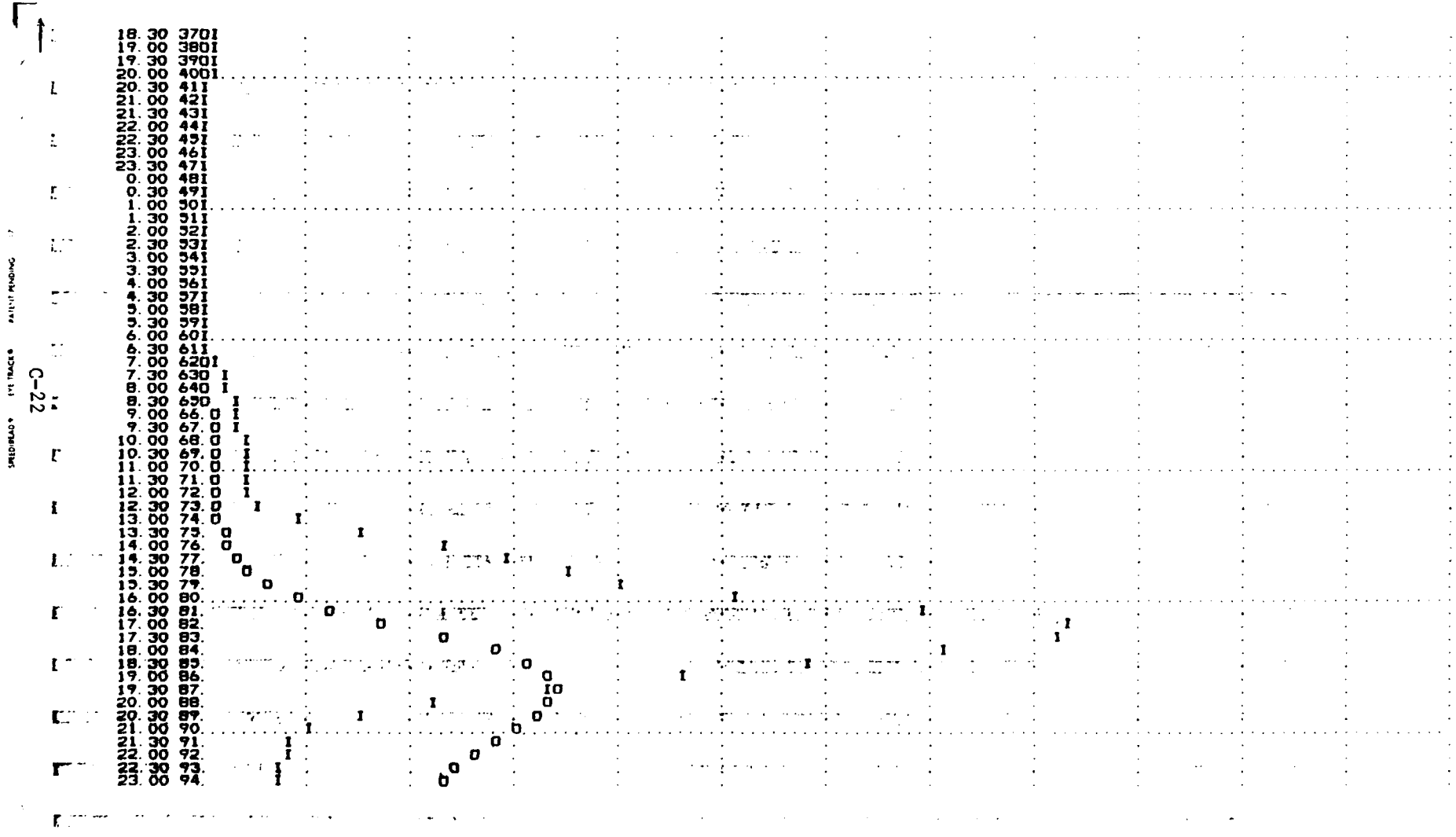
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	135.	114.	60.	24.	2916.
CMS	4.	3.	2.	1.	83.
INCHES		4.10	8.34	8.69	8.69
MM		104.04	216.80	220.79	220.79
AC-FT		57.	118.	120.	120.
THOUS CU M		70.	146.	149.	149.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	40.	80.	120.	160.	200.	240.	280.	320.	360.	0	0	0
0.30	11												
1.00	21												
1.30	31												
2.00	41												
2.30	51												
3.00	61												
3.30	71												
4.00	81												
4.30	91												
5.00	101												
5.30	111												
6.00	121												
6.30	131												
7.00	141												
7.30	151												
8.00	161												
8.30	171												
9.00	181												
9.30	191												
10.00	201												
10.30	211												
11.00	221												
11.30	231												
12.00	241												
12.30	251												
13.00	261												
13.30	271												
14.00	281												
14.30	291												
15.00	301												
15.30	311												
16.00	321												
16.30	3301												
17.00	3401												
17.30	350 I												
18.00	360 I												


18.30 370
19.00 380
19.30 390
20.00 400
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
0.30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 551
4.00 561
4.30 571
5.00 581
5.30 591
6.00 601
6.30 611
7.00 620
7.30 630
8.00 640
8.30 650
9.00 66.0
9.30 67.0
10.00 68.0
10.30 69.0
11.00 70.0
11.30 71.0
12.00 72.0
12.30 73.0
13.00 74.0
13.30 75.
14.00 76.
14.30 77.
15.00 78.
15.30 79.
16.00 80.
16.30 81.
17.00 82.
17.30 83.
18.00 84.
18.30 85.
19.00 86.
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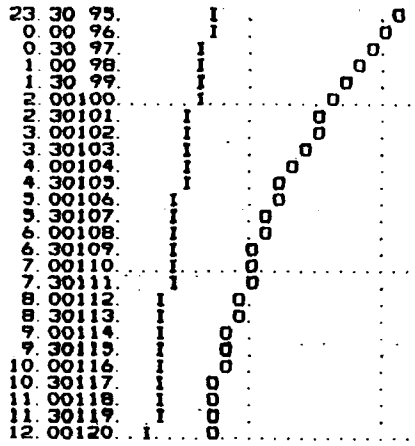
21.30 91.
22.00 92.
22.30 93.
23.00 94.



DVN

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	3.	3.	4.	4.
4.	5.	5.	6.	8.	11.	14.	21.	30.	40.
97.	79.	104.	125.	141.	150.	153.	149.	142.	133.
124.	116.	108.	101.	95.	89.	83.	79.	75.	71.
67.	64.	60.	57.	54.	52.	49.	46.	44.	43.
41.	39.	38.	36.	35.	34.	32.	31.	30.	29.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	3.	3.	4.	4.	5.
5.	6.	6.	7.	9.	12.	16.	21.	27.	34.

43.	54.	65.	74.	80.	84.	85.	84.	81.	77.
74.	70.	67.	64.	61.	59.	56.	54.	52.	50.
48.	46.	45.	43.	42.	40.	39.	38.	37.	36.
35.	34.	33.	32.	31.	30.	29.	28.	27.	27.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.1	1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.6	1630.7	1630.9
1631.2	1631.4	1631.7	1632.0	1632.1	1632.2	1632.3	1632.2	1632.1	1632.1
1632.0	1631.9	1631.8	1631.7	1631.6	1631.6	1631.5	1631.4	1631.4	1631.3
1631.3	1631.2	1631.2	1631.2	1631.1	1631.1	1631.1	1631.0	1631.0	1631.0
1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8	1630.7	1630.7

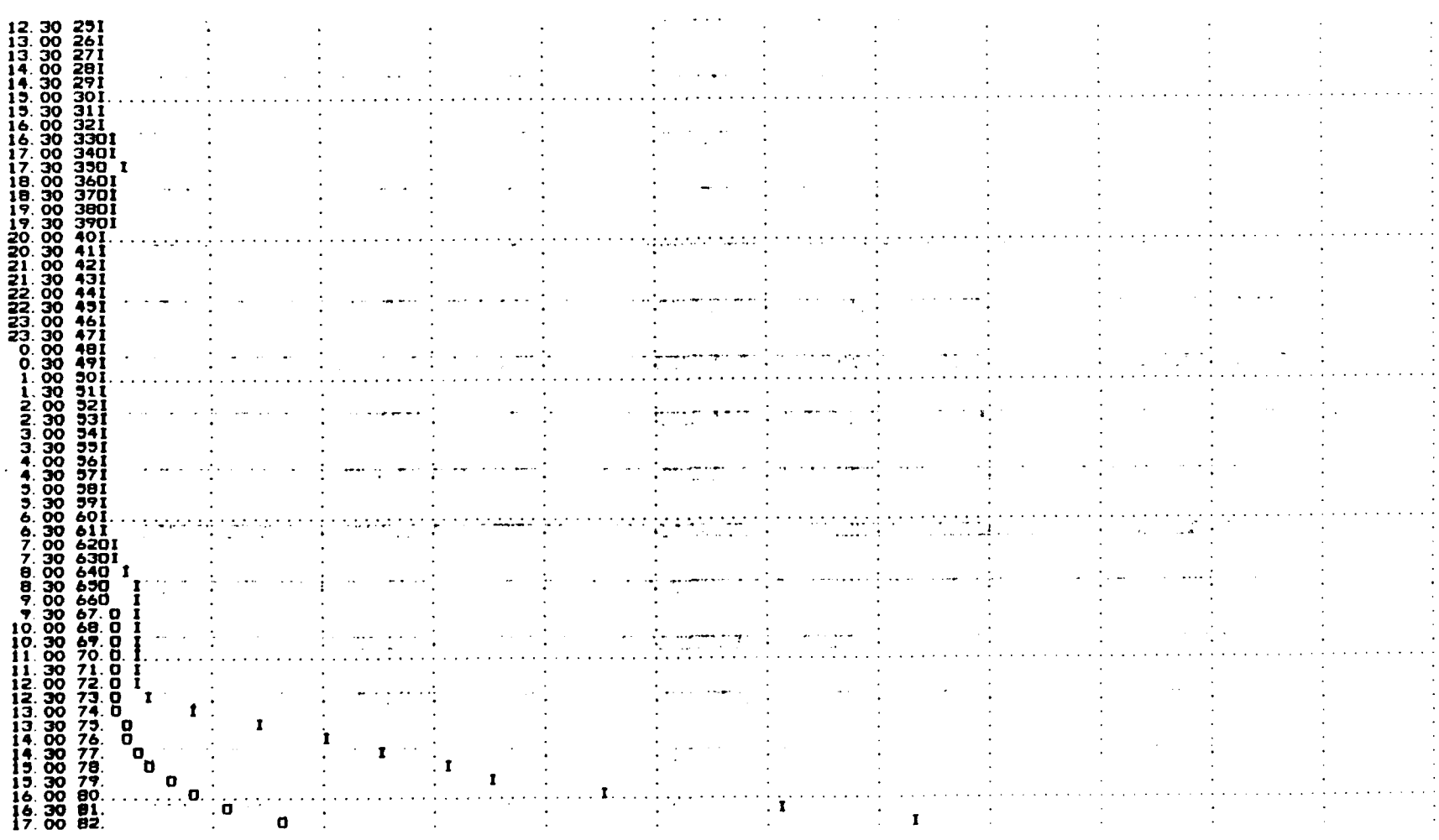
PEAK OUTFLOW IS 153. AT TIME 43.50 HOURS

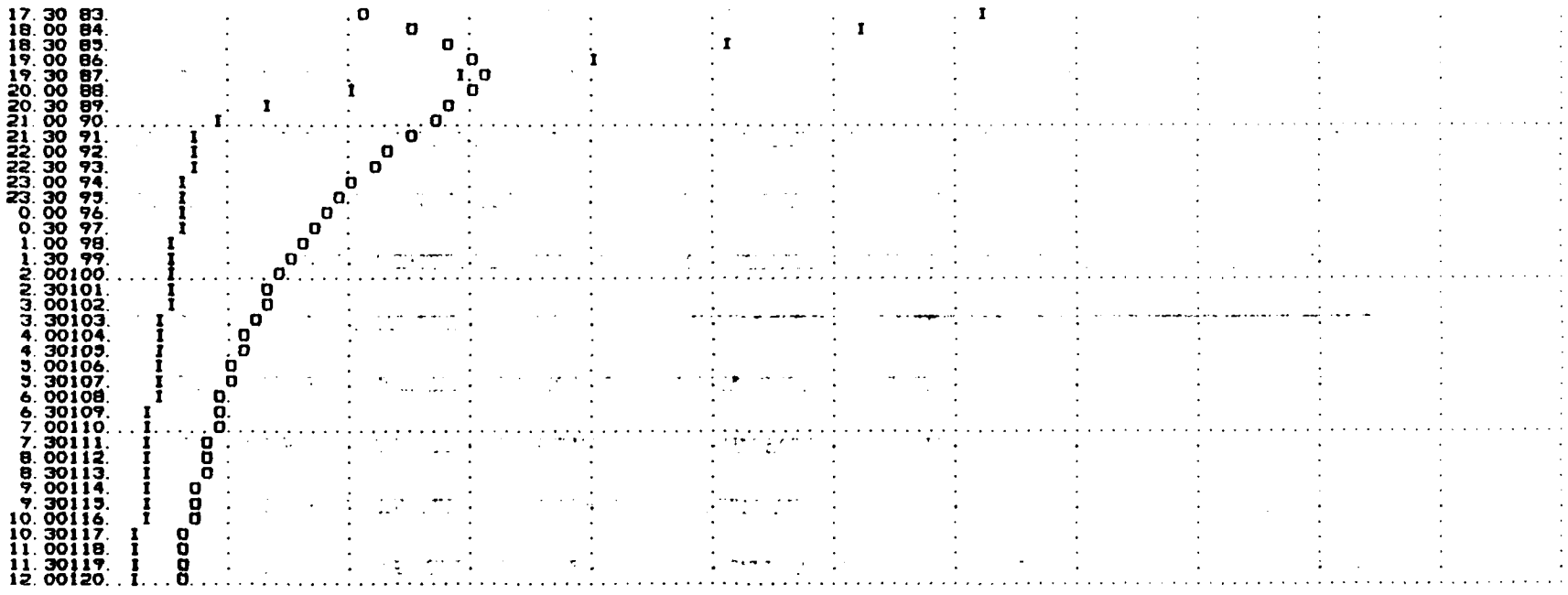
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	153.	129.	66.	27.	3237.
CMS	4.	4.	2.	1.	92.
INCHES		4.60	9.48	9.65	9.65
MM		116.89	240.69	245.18	245.18
AC-FT		64.	131.	134.	134.
THOUS CU M		79.	162.	165.	165.

OVF

STATION 1

```
                          INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
            0.       50.      100.      150.      200.      250.      300.      350.      400.       0.        0.        0.        0.
  0.30  1I
  1.00  2I
  1.30  3I
  2.00  4I
  2.30  5I
  3.00  6I
  3.30  7I
  4.00  8I
  4.30  9I
  5.00 10I.........................................................................................................................
  5.30 11I
  6.00 12I
  6.30 13I
  7.00 14I
  7.30 15I
  8.00 16I
  8.30 17I
  9.00 18I
  9.30 19I
 10.00 20I.........................................................................................................................
 10.30 21I
 11.00 22I
 11.30 23I
 12.00 24I
```


12.30 291
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 3301
17.00 3401
17.30 350 I
18.00 3601
18.30 3701
19.00 3801
19.30 3901
20.00 401
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
0.30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 551
4.00 561
4.30 571
5.00 581
5.30 591
6.00 601
6.30 611
7.00 6201
7.30 6301
8.00 640 I
8.30 650 I
9.00 660 I
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75. 0 I
14.00 76. 0 I
14.30 77. 0 I
15.00 78. 0 I
15.30 79. 0 I
16.00 80. 0 I
16.30 81. 0 I
17.00 82. 0 I



OVN

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	3.	3.	4.	4.
5.	5.	6.	7.	9.	12.	15.	24.	33.	45.
64.	89.	117.	141.	158.	168.	170.	166.	158.	148.
137.	127.	119.	111.	104.	97.	91.	86.	81.	76.

72.	69.	65.	62.	59.	56.	53.	50.	48.	46.
44.	42.	40.	39.	37.	36.	35.	33.	32.	31.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0	0.
0.	0.	0.	0.	0.	0.	0.	0.	0	0.
0.	0.	0.	0.	0.	0.	0.	0.	0	0.
0.	0.	0.	0.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	3.	4.	5.	5.
6.	6.	7.	8.	10.	13.	18.	23.	30.	37.
47.	59.	71.	80.	87.	91.	91.	90.	87.	83.
79.	75.	71.	68.	65.	62.	60.	57.	55.	53.
51.	49.	47.	46.	44.	43.	41.	40.	39.	37.
36.	35.	34.	33.	32.	31.	30.	30.	29.	28.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.6	1630.8	1631.0
1631.3	1631.6	1631.9	1632.1	1632.3	1632.4	1632.4	1632.4	1632.3	1632.2
1632.1	1632.0	1631.9	1631.8	1631.7	1631.7	1631.6	1631.5	1631.5	1631.4
1631.4	1631.3	1631.3	1631.2	1631.2	1631.1	1631.1	1631.1	1631.0	1631.0
1631.0	1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 170. AT TIME 43.50 HOURS

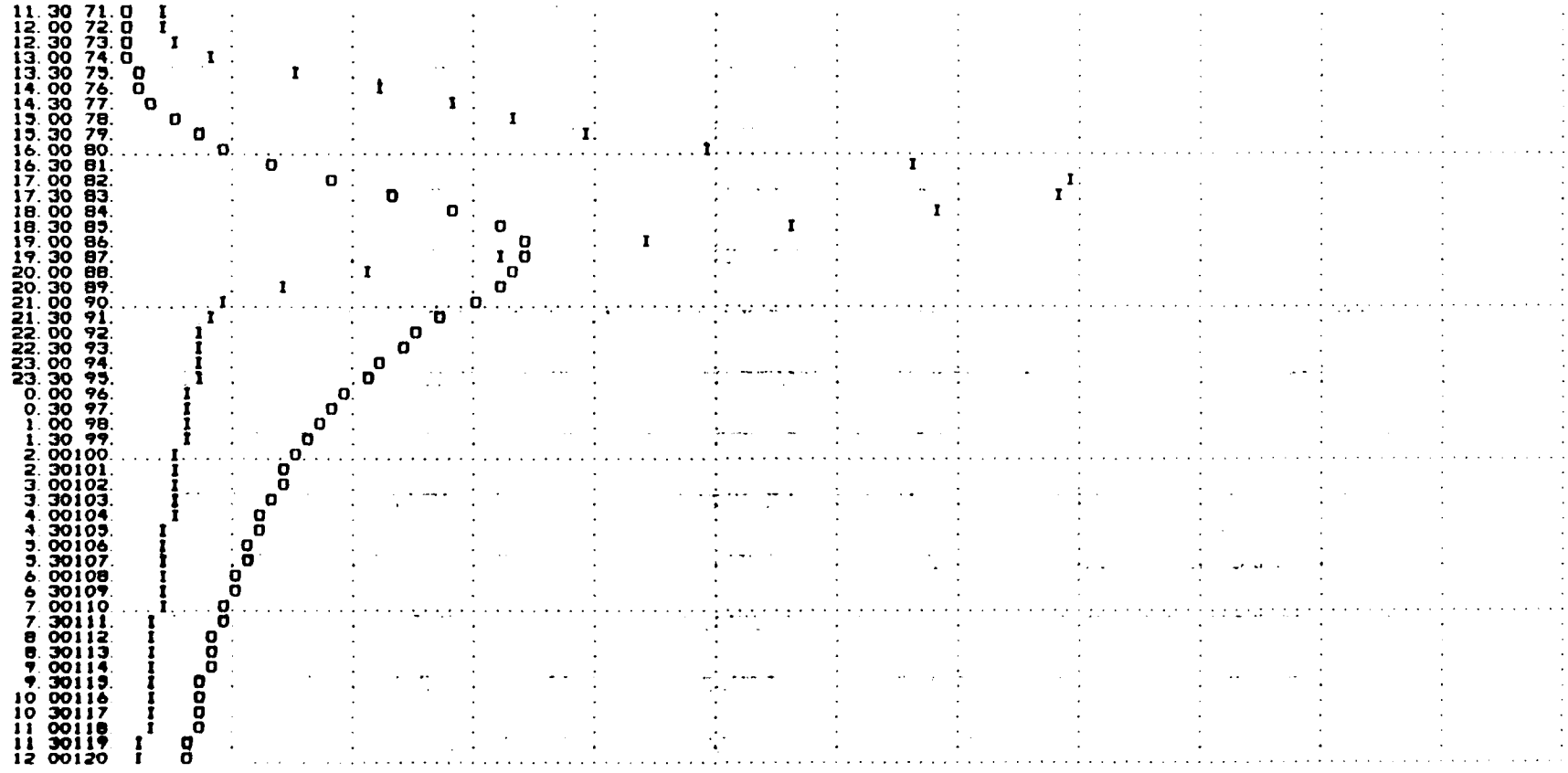
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	170.	143.	73.	30.	3557.
CMS	5.	4.	2.	1.	101.
INCHES		5.11	10.42	10.61	10.61
MM		129.77	264.60	269.53	269.53
AC-FT		71.	144.	147.	147.
THOUS CU M		87.	178.	181.	181.

DVF

STATION 1

```
                 INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
            0.    50.   100.   150.   200.   250.   300.   350.   400.     0.     0.     0.     0.
 0.30   1I
 1.00   2I
 1.30   3I
 2.00   4I
 2.30   5I
 3.00   6I
 3.30   7I
 4.00   8I
 4.30   9I
 5.00  10I
 5.30  11I
 6.00  12I
```

```
 6.30 131
 7.00 141
 7.30 151
 8.00 161
 8.30 171
 9.00 181
 9.30 191
10.00 201
10.30 211
11.00 221
11.30 231
12.00 241
12.30 251
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 3301
17.00 3401
17.30 350 I
18.00 360 I
18.30 3701
19.00 3801
19.30 3901
20.00 4001
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
 0.00 481
 0.30 491
 1.00 501
 1.30 511
 2.00 521
 2.30 531
 3.00 541
 3.30 551
 4.00 561
 4.30 571
 5.00 581
 5.30 591
 6.00 601
 6.30 611
 7.00 6201
 7.30 630 I
 8.00 640 I
 8.30 650  I
 9.00 660  I
 9.30 67.0 I
10.00 68.0 I
10.30 69.0  I
11.00 70.0  I
```



•OVN•

STATION 1, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	3.	3.	4.	4.	5.
5.	5.	6.	7.	9.	12.	16.	24.	34.	46.
66.	91.	119.	144.	162.	171.	173.	169.	161.	151.
140.	129.	121.	113.	106.	99.	93.	87.	82.	78.
74.	70.	66.	63.	60.	57.	54.	51.	49.	46.
44.	43.	41.	39.	38.	36.	35.	34.	32.	31.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	3.	4.	3.	5.
6.	6.	7.	8.	10.	14.	18.	24.	30.	38.
48.	60.	72.	82.	88.	92.	93.	91.	88.	84.
80.	76.	72.	69.	66.	63.	60.	58.	56.	53.
51.	50.	48.	46.	44.	43.	42.	40.	39.	38.
37.	36.	34.	33.	33.	32.	31.	30.	29.	28.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.6	1630.8	1631.0
1631.3	1631.6	1631.9	1632.2	1632.3	1632.4	1632.5	1632.4	1632.3	1632.2
1632.1	1632.0	1631.9	1631.8	1631.8	1631.7	1631.6	1631.5	1631.5	1631.4
1631.4	1631.3	1631.3	1631.2	1631.2	1631.2	1631.1	1631.1	1631.0	1631.0
1631.0	1631.0	1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 173. AT TIME 43.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	173.	146.	74.	30.	3624.
CMS	5.	4.	2.	1.	103.
INCHES		5.21	10.61	10.81	10.81
MM		132.35	269.42	274.46	274.46
AC-FT		72.	147.	150.	150.
THOUS CU M		89.	181.	185.	185.

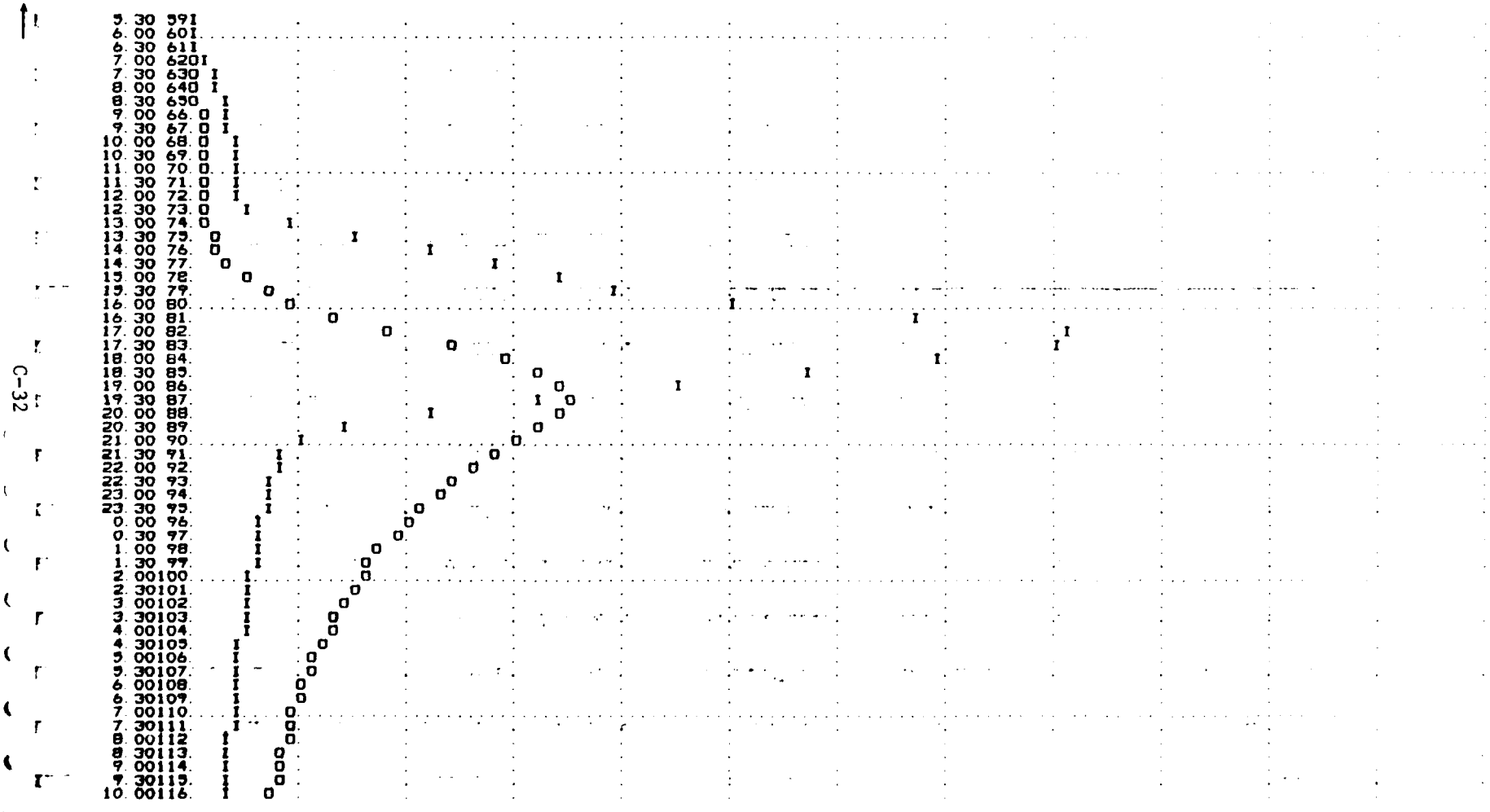
OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0. 50. 100. 150. 200. 250. 300. 350. 400. 450. 0. 0. 0

0.30 1I
1.00 2I
1.30 3I
2.00 4I
2.30 5I
3.00 6I
3.30 7I
4.00 8I
4.30 9I
5.00 10I
5.30 11I
6.00 12I
6.30 13I
7.00 14I
7.30 15I
8.00 16I
8.30 17I
9.00 18I
9.30 19I
10.00 20I
10.30 21I
11.00 22I
11.30 23I
12.00 24I
12.30 25I
13.00 26I
13.30 27I
14.00 28I
14.30 29I
15.00 30I
15.30 31I
16.00 32I
16.30 330I
17.00 340I
17.30 350 I
18.00 360 I
18.30 370I
19.00 380I
19.30 390I
20.00 400I
20.30 41I
21.00 42I
21.30 43I
22.00 44I
22.30 45I
23.00 46I
23.30 47I
0.00 48I
0.30 49I
1.00 50I
1.30 51I
2.00 52I
2.30 53I
3.00 54I
3.30 55I
4.00 56I
4.30 57I
5.00 58I


5:30 591
6:00 601
6:30 611
7:00 620
7:30 630
8:00 640
8:30 650
9:00 66.0
9:30 67.0
10:00 68.0
10:30 69.0
11:00 70.0
11:30 71.0
12:00 72.0
12:30 73.0
13:00 74.0
13:30 75.
14:00 76.
14:30 77.
15:00 78.
15:30 79.
16:00 80.
16:30 81.
17:00 82.
17:30 83.
18:00 84.
18:30 85.
19:00 86.
19:30 87.
20:00 88.
20:30 89.
21:00 90.
21:30 91.
22:00 92.
22:30 93.
23:00 94.
23:30 95.
0:00 96.
0:30 97.
1:00 98.
1:30 99.
2:00100.
2:30101.
3:00102.
3:30103.
4:00104.
4:30105.
5:00106.
5:30107.
6:00108.
6:30109.
7:00110.
7:30111.
8:00112.
8:30113.
9:00114.
9:30115.
10:00116.

```
10.30117.   I   O .
11 00118.   I   O
11 30119.   I  O
12.00120..I...O.......................................................
```

OVN

STATION 1, PLAN 1, RATIO 5

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	3.	3.	4.	4.	5.
5.	6.	6.	7.	9.	12.	16.	25.	35.	47.
67.	93.	122.	148.	165.	175.	177.	173.	164.	154.
142.	132.	123.	115.	107.	101.	94.	88.	83.	79.
75.	71.	67.	64.	61.	58.	55.	52.	49.	47.
45.	43.	41.	40.	38.	37.	35.	34.	33.	31.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	4.	4.	5.	5.
6.	6.	7.	8.	10.	14.	18.	24.	31.	38.
48.	60.	73.	83.	90.	73.	74.	92.	89.	85.
81.	77.	73.	70.	67.	64.	61.	58.	56.	54.
52.	50.	48.	47.	45.	43.	42.	41.	39.	38
37.	36.	35.	34.	33.	32.	31.	30.	29.	28.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.7	1630.8	1631.0
1631.3	1631.6	1631.9	1632.2	1632.4	1632.5	1632.5	1632.4	1632.4	1632.3
1632.2	1632.0	1631.9	1631.9	1631.8	1631.7	1631.6	1631.6	1631.5	1631.4
1631.4	1631.3	1631.3	1631.2	1631.2	1631.2	1631.1	1631.1	1631.1	1631.0
1631.0	1631.0	1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 177. AT TIME 13.50 HOURS

PEAK 6-HOUR 24-HOUR 72-HOUR TOTAL VOLUME

CFS	177.	148.	75.	31.	3689.
CMS	5.	4.	2.	1.	104.
INCHES		5.31	10.80	11.00	11.00
MM		134.94	274.24	279.33	279.33
AC-FT		74.	130.	152.	152.
THOUS CU M		91.	185.	188.	188.

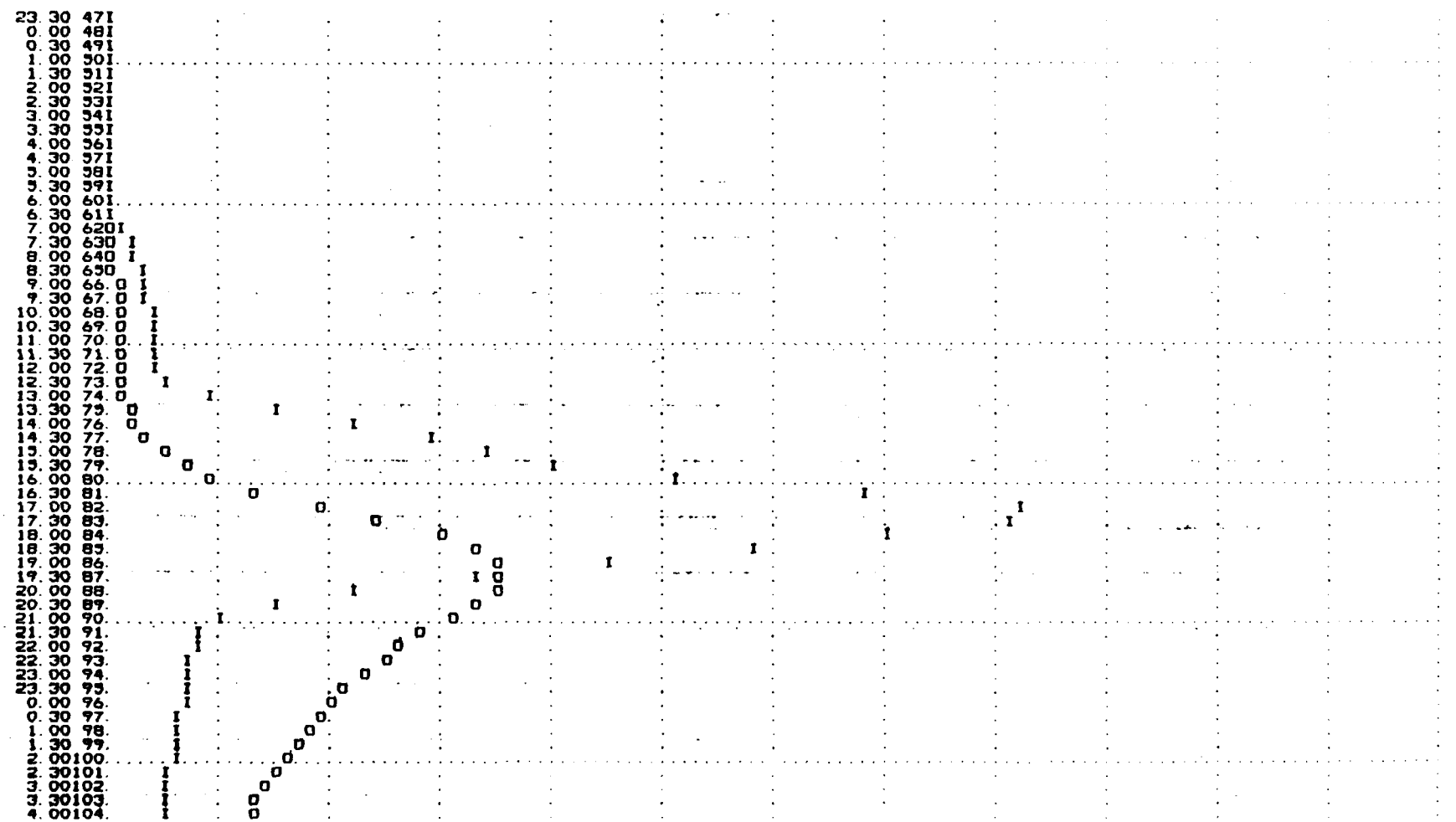
DVF

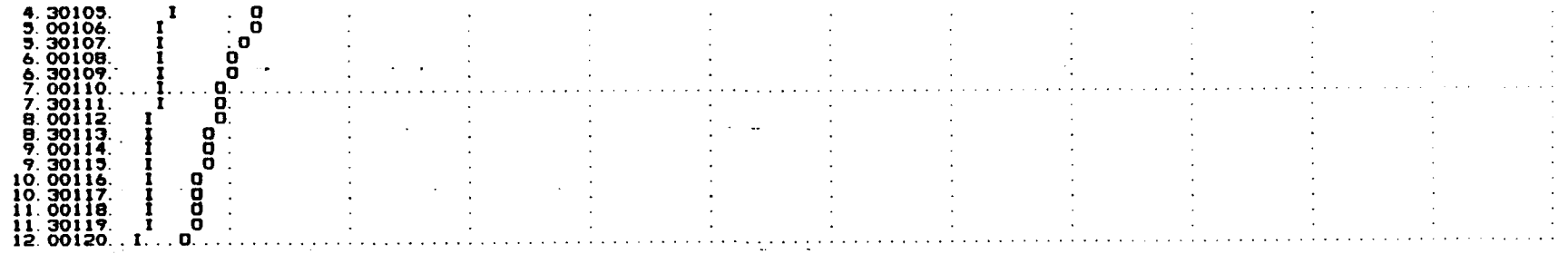
STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0. 50. 100. 150. 200. 250. 300. 350. 400. 450. 0. 0. 0

0.30 11
1.00 21
1.30 31
2.00 41
2.30 51
3.00 61
3.30 71
4.00 81
4.30 91
5.00 101
5.30 111
6.00 121
6.30 131
7.00 141
7.30 151
8.00 161
8.30 171
9.00 181
9.30 191
10.00 201
10.30 211
11.00 221
11.30 231
12.00 241
12.30 251
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 330I
17.00 340I
17.30 350 I
18.00 360 I
18.30 370I
19.00 380I
19.30 390I
20.00 400I
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461





OVN

STATION 1; PLAN 1, RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	3.	3.	4.	4.	5.
5.	6.	6.	7.	9.	12.	16.	25.	36.	49.
69.	99.	125.	151.	169.	178.	182.	176.	167.	157.
145.	134.	125.	117.	109.	102.	96.	90.	84.	80.
76.	72.	68.	65.	61.	58.	55.	53.	50.	48.
45.	44.	42.	40.	39.	37.	36.	34.	33.	32.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	3.	3.	4.	4	5	5
6.	7.	7.	8.	11.	14.	19.	25.	31.	39.
49.	61.	74.	84.	91.	95.	95.	94.	90.	86.
82.	78.	74.	71.	67.	64.	62.	59.	57.	55.
52.	51.	49.	47.	45.	44.	42.	41.	40.	38.
37.	36.	35.	34.	33.	32.	31.	30.	30.	29.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.7	1630.8	1631.0
1631.3	1631.6	1632.0	1632.2	1632.4	1632.5	1632.5	1632.5	1632.4	1632.3
1632.2	1632.1	1632.0	1631.9	1631.8	1631.7	1631.6	1631.6	1631.5	1631.5
1631.4	1631.4	1631.3	1631.3	1631.2	1631.2	1631.1	1631.1	1631.1	1631.0
1631.0	1631.0	1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 182. AT TIME 43.50 HOURS

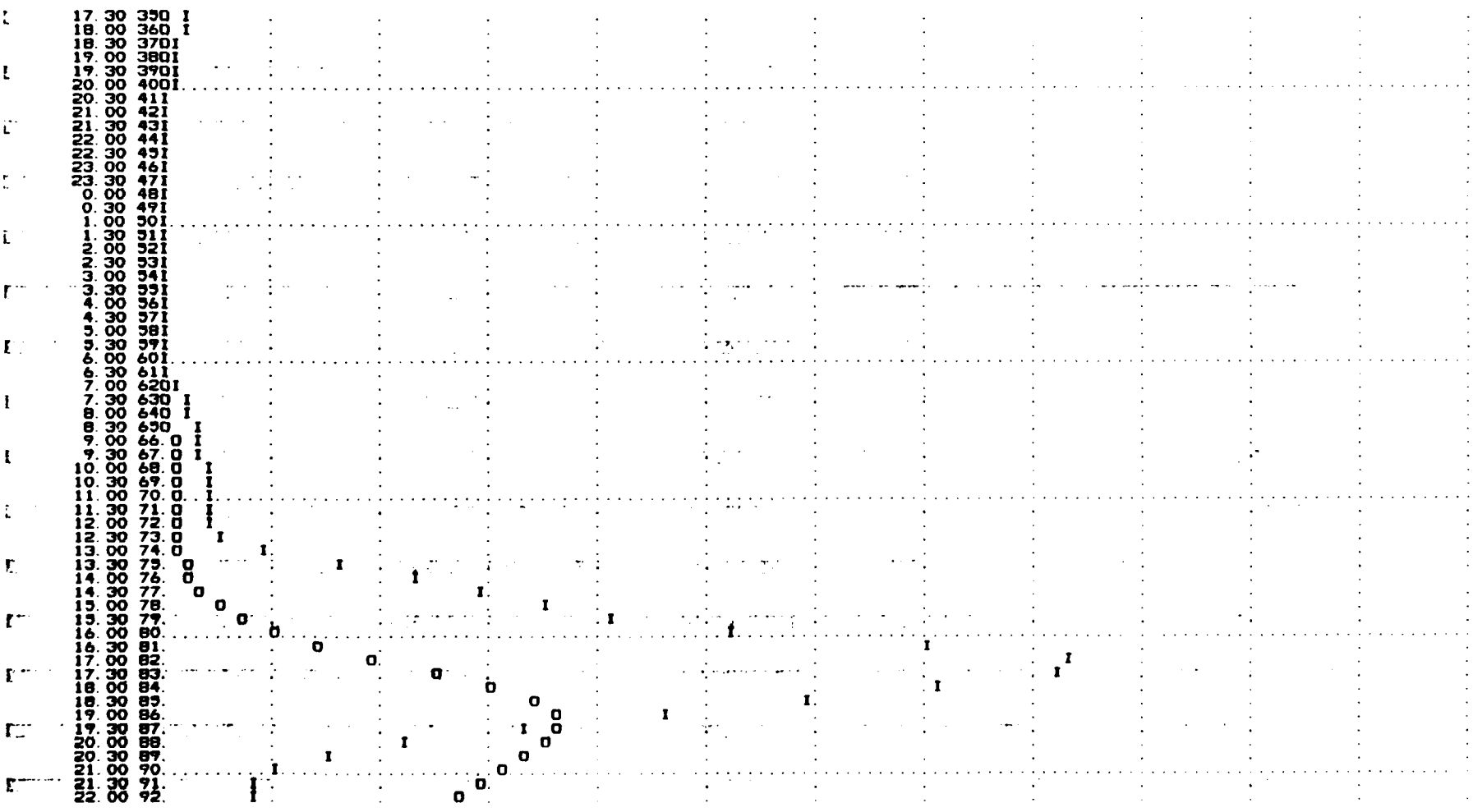
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	182.	151.	77.	31.	3754.
CMS	5.	4.	2.	1.	106.
INCHES		5.42	10.99	11.19	11.19
MM		137.60	279.07	284.27	284.27
AC-FT		79.	192.	155.	155.
THOUS CU M		93.	188.	191.	191.

OVF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	50.	100.	150.	200.	250.	300.	350.	400.	450	0	0	0
0.30	11												
1.00	21												
1.30	31												
2.00	41												
2.30	51												
3.00	61												
3.30	71												
4.00	81												
4.30	91												
5.00	101												
5.30	111												
6.00	121												
6.30	131												
7.00	141												
7.30	151												
8.00	161												
8.30	171												
9.00	181												
9.30	191												
10.00	201												
10.30	211												
11.00	221												
11.30	231												
12.00	241												
12.30	251												
13.00	261												
13.30	271												
14.00	281												
14.30	291												
15.00	301												
15.30	311												
16.00	321												
16.30	3301												
17.00	3401												


17.30 350 I
18.00 360 I
18.30 370I
19.00 380I
19.30 390I
20.00 400I
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
0.00 481
0.30 491
1.00 501
1.30 511
2.00 521
2.30 531
3.00 541
3.30 551
4.00 561
4.30 571
5.00 581
5.30 591
6.00 601
6.30 611
7.00 620I
7.30 630 I
8.00 640 I
8.30 650 I
9.00 66.0 I
9.30 67.0 I
10.00 68.0 I
10.30 69.0 I
11.00 70.0 I
11.30 71.0 I
12.00 72.0 I
12.30 73.0 I
13.00 74.0 I
13.30 75. 0 I
14.00 76. 0 I
14.30 77. 0 I
15.00 78. 0 I
15.30 79. 0 I
16.00 80. 0 I
16.30 81. 0 I
17.00 82. 0 I
17.30 83. 0 I
18.00 84. 0 I
18.30 85. 0 I
19.00 86. 0 I
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20.00 88. 0 I
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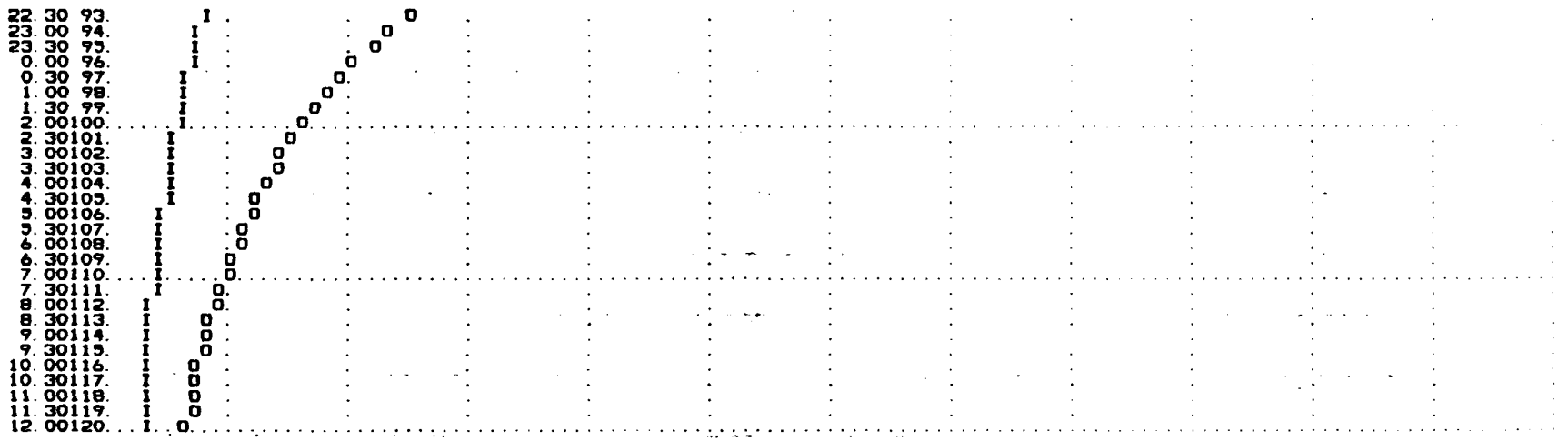
22.00 92. 0 I



DVN

STATION 1, PLAN 1, RATIO 7

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	3.	3.	4.	4.	3.
5.	6.	6.	7.	9.	12.	17.	26.	36.	50.
70.	97.	127.	154.	172.	185.	189.	179.	170.	159.
147.	136.	126.	118.	111.	104.	97.	91.	86.	81.
77.	73.	69.	65.	62.	59.	56.	53.	51.	48.
46.	44.	42.	41.	39.	38.	36.	35.	34.	32.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

1.	2.	2.	2.	3.	3.	4.	4.	5.	5.
6.	7.	7.	8.	11.	14.	17.	25.	32.	37.
50.	62.	75.	85.	92.	96.	96.	95.	91.	87.
83.	79.	75.	71.	68.	65.	62.	60.	57	55.
53.	51.	49.	47.	46.	44.	43.	41.	40.	39.
38.	36.	35.	34.	33.	32.	31.	31.	30.	29.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.7	1630.9	1631.1
1631.3	1631.7	1632.0	1632.3	1632.4	1632.5	1632.6	1632.5	1632.4	1632.3
1632.2	1632.1	1632.0	1631.9	1631.8	1631.7	1631.7	1631.6	1631.5	1631.5
1631.4	1631.4	1631.3	1631.3	1631.2	1631.2	1631.1	1631.1	1631.1	1631.0
1631.0	1631.0	1631.0	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 189. AT TIME 43.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	189.	155.	78.	32.	3819.
CMS	5.	4.	2.	1.	108.
INCHES		5.53	11.18	11.39	11.39
MM		140.44	283.94	289.23	289.23
AC-FT		77.	155.	158.	158.
THOUS CU M		95.	191.	195.	195.

OVF

STATION 1

```
                 INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
          0.     50.    100.   150.   200.   250.   300.   350.   400.   450.   0.   0.   0.
 0.30   1I
 1.00   2I
 1.30   3I
 2.00   4I
 2.30   5I
 3.00   6I
 3.30   7I
 4.00   8I
 4.30   9I
 5.00  10I
 5.30  11I
 6.00  12I
 6.30  13I
 7.00  14I
 7.30  15I
 8.00  16I
 8.30  17I
 9.00  18I
 9.30  19I
10.00  20I
10.30  21I
11.00  22I
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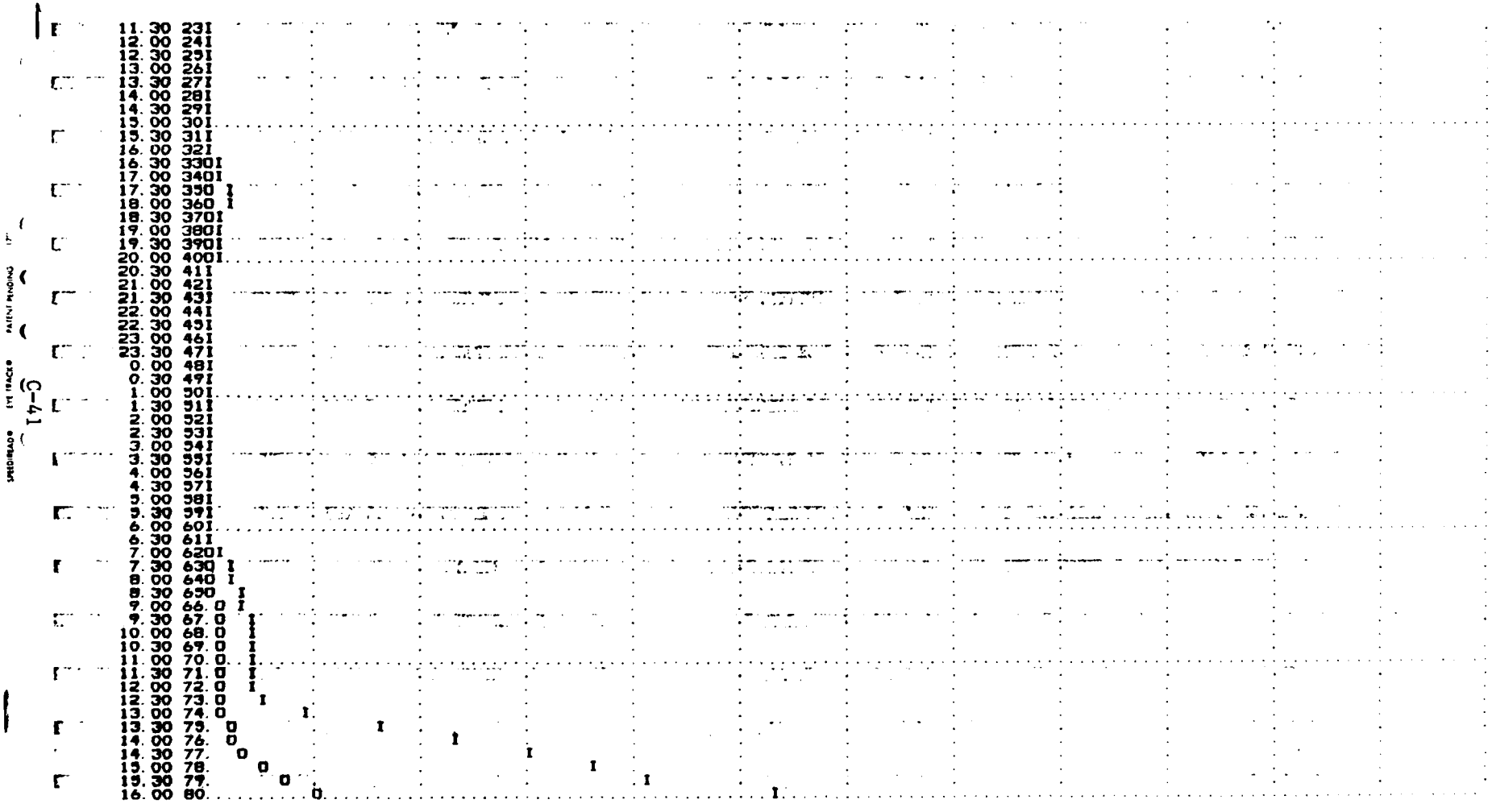
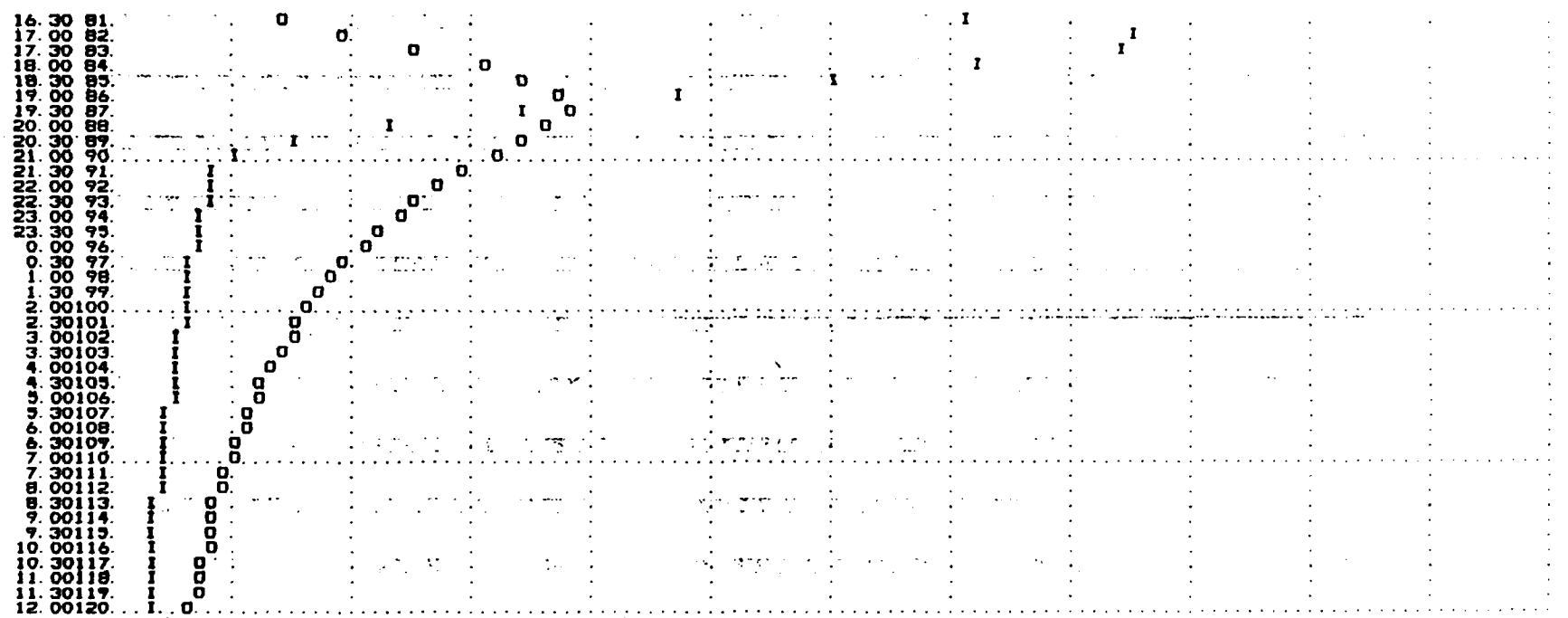




OVN

STATION 1; PLAN 1; RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2.	2.	2.	0.	1.	1.	1.	1.	1.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
3.	4.	4.	2.	2.	3.	3.	4.	4.	5.
5.	6.	6.	7.	9.	12.	17.	27.	37.	51.

72.	99.	130.	157.	175.	194.	197.	183.	172.	161.
149.	138.	128.	119.	112.	105.	98.	92.	87.	81.
77.	73.	70.	66.	63.	60.	57.	54.	51.	49.
46.	44.	43.	41.	40.	38.	37.	35.	34.	33.

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	3.	3.	4.	4.	5.	6.
6.	7.	7.	9.	11.	14.	19.	25.	32.	40.
50.	63.	76.	87.	94.	97.	97.	96.	92.	88.
83.	79.	75.	72.	68.	65.	63.	60.	58.	55.
53.	51.	49.	48.	46.	44.	43.	42.	40.	39.
38.	37.	36.	35.	34.	33.	32.	31.	30.	29.

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.2
1630.2	1630.2	1630.2	1630.2	1630.3	1630.4	1630.5	1630.7	1630.9	1631.1
1631.4	1631.7	1632.0	1632.3	1632.5	1632.6	1632.6	1632.5	1632.4	1632.3
1632.2	1632.1	1632.0	1631.9	1631.8	1631.7	1631.7	1631.6	1631.5	1631.5
1631.4	1631.4	1631.3	1631.3	1631.2	1631.2	1631.2	1631.1	1631.1	1631.1
1631.0	1631.0	1631.0	1630.9	1630.9	1630.9	1630.9	1630.8	1630.8	1630.8

PEAK OUTFLOW IS 197. AT TIME 43.50 HOURS

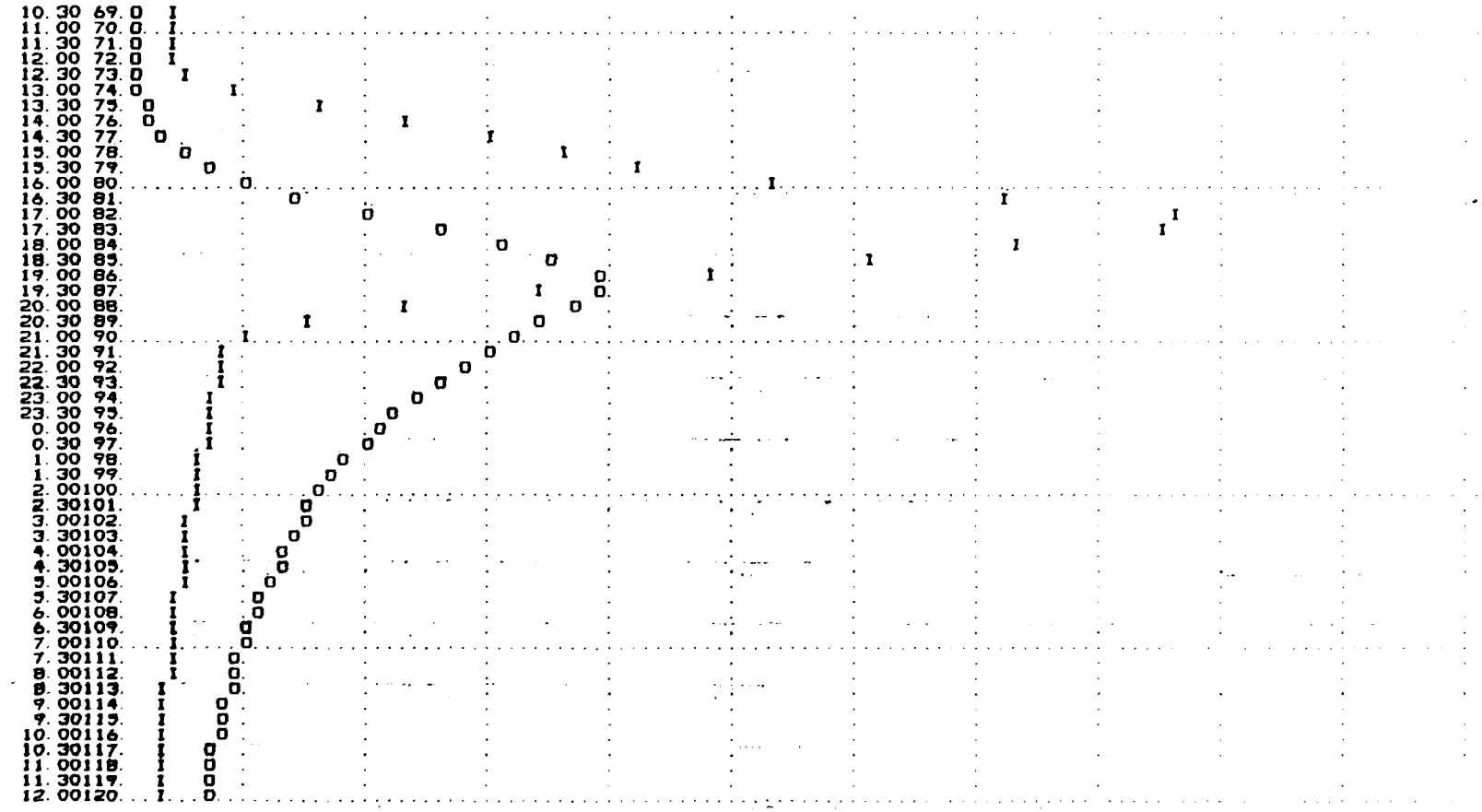
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	197.	158.	79.	32.	3884.
CMS	6.	4.	2.	1.	110.
INCHES		5.65	11.37	11.58	11.58
MM		143.42	288.77	294.13	294.13
AC-FT		78.	158.	160.	160.
THOUS CU M		97.	194.	198.	198.

OVF

STATION 1

```
                      INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
            0.    50.   100.   150.   200.   250.   300.   350.   400.   450.   0.   0   0
 0.30  1I
 1.00  2I
 1.30  3I
 2.00  4I
 2.30  5I
 3.00  6I
 3.30  7I
 4.00  8I
 4.30  9I
 5.00 10I.......................................................................
```

```
 5.30 111
 6.00 121
 6.30 131
 7.00 141
 7.30 151
 8.00 161
 8.30 171
 9.00 181
 9.30 191
10.00 201
10.30 211
11.00 221
11.30 231
12.00 241
12.30 251
13.00 261
13.30 271
14.00 281
14.30 291
15.00 301
15.30 311
16.00 321
16.30 330I
17.00 340I
17.30 350 I
18.00 360 I
18.30 370I
19.00 380I
19.30 390I
20.00 400I
20.30 411
21.00 421
21.30 431
22.00 441
22.30 451
23.00 461
23.30 471
 0.00 481
 0.30 491
 1.00 501
 1.30 511
 2.00 521
 2.30 531
 3.00 541
 3.30 551
 4.00 561
 4.30 571
 5.00 581
 5.30 591
 6.00 601
 6.30 611
 7.00 6201
 7.30 630 I
 8.00 640 I
 8.30 650 I
 9.00 66.0 I
 9.30 67.0 I
10.00 68.0 I
```



OVN

STATION 1, PLAN 1, RATIO 9

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0	0.
0	0.	0	0	0.	0.	0	0	0	0
0.	0.	0.	0.	0.	0.	0	0	0	0
0.	0.	0.	1.	1.	1.	2.	2.	2.	2
2.	2.	2.	2.	2.	2.	2.	2.	2.	2
2.	2.	2.	2.	2.	2.	2.	2.	2.	2
2.	2.	2.	3.	4.	4.	5.	6.	7.	7.
8.	9.	10.	11.	14.	22.	33.	48.	68.	93.
129.	178.	358.	489.	503.	456.	383.	306.	240.	192.
172.	161.	151.	141.	132.	125.	118.	112.	106.	100
95.	90.	86.	82.	78.	75.	72.	69.	66.	63
60.	58.	55.	53.	51.	49.	46.	45	43.	42.

STORAGE

0.	0.	0.	0.	0.	0.	0	0	0.	0
0.	0.	0.	0.	0.	0.	0	0	0.	0
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	2.	2	2	3	3
3.	3.	3.	3.	3.	3.	3	3	2	2
2.	2.	2.	2	2.	2.	2	2	2	2
2.	2.	3.	3.	4.	5.	6.	7.	8	9.
10.	10.	11.	13	17.	22.	30.	38	48	60
76.	94	110.	118	119.	116.	112.	107	102	97
92.	88.	84.	80	77.	74.	71	68	66	64.
61.	59.	57.	55.	54.	52.	50.	49.	47.	46.
45.	43.	42.	41	40.	39.	38	37	36	35

STAGE

1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.0
1630.0	1630.0	1630.0	1630.0	1630.0	1630.0	1630.1	1630.1	1630.1	1630.1
1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.1
1630.1	1630.1	1630.1	1630.1	1630.1	1630.1	1630.2	1630.2	1630.2	1630.2
1630.3	1630.3	1630.3	1630.4	1630.5	1630.6	1630.8	1631.0	1631.3	1631.6
1632.0	1632.5	1632.9	1633.1	1633.1	1633.1	1632.9	1632.8	1632.7	1632.6
1632.4	1632.3	1632.2	1632.1	1632.1	1632.0	1631.9	1631.8	1631.8	1631.7
1631.6	1631.6	1631.5	1631.5	1631.4	1631.4	1631.4	1631.3	1631.3	1631.2
1631.2	1631.2	1631.1	1631.1	1631.1	1631.0	1631.0	1631.0	1631.0	1630.9

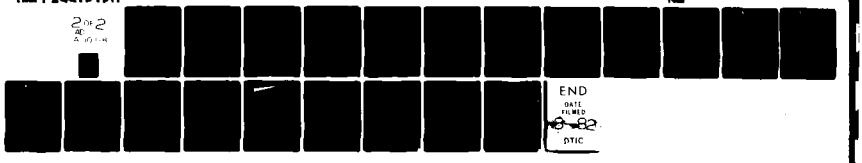
PEAK OUTFLOW IS 503. AT TIME 42.50 HOURS

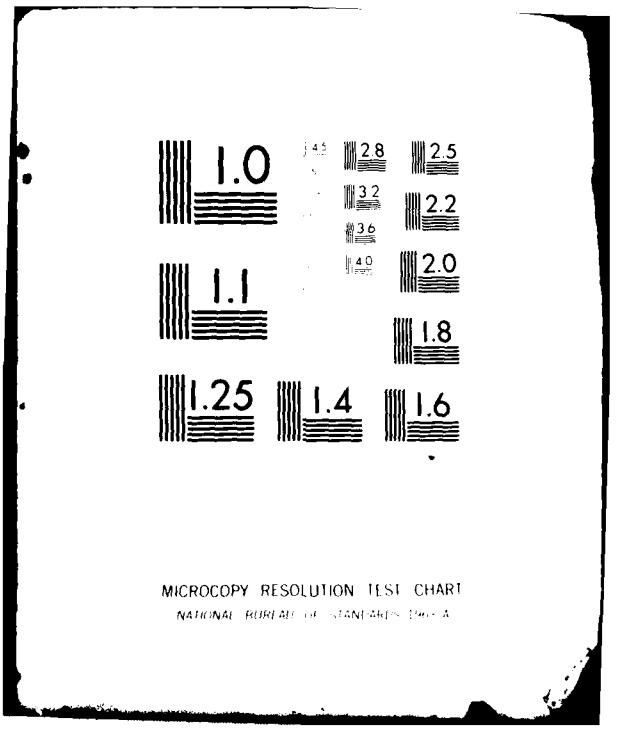
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	503.	298.	127.	52.	6221.
CMS	14.	8.	4.	1.	176.
INCHES		10.66	18.21	18.55	18.55
MM		270.87	462.60	471.09	471.09
AC-FT		148.	252.	257.	257.
THOUS CU M		182.	311.	317	317

•OVF•

STATION 1

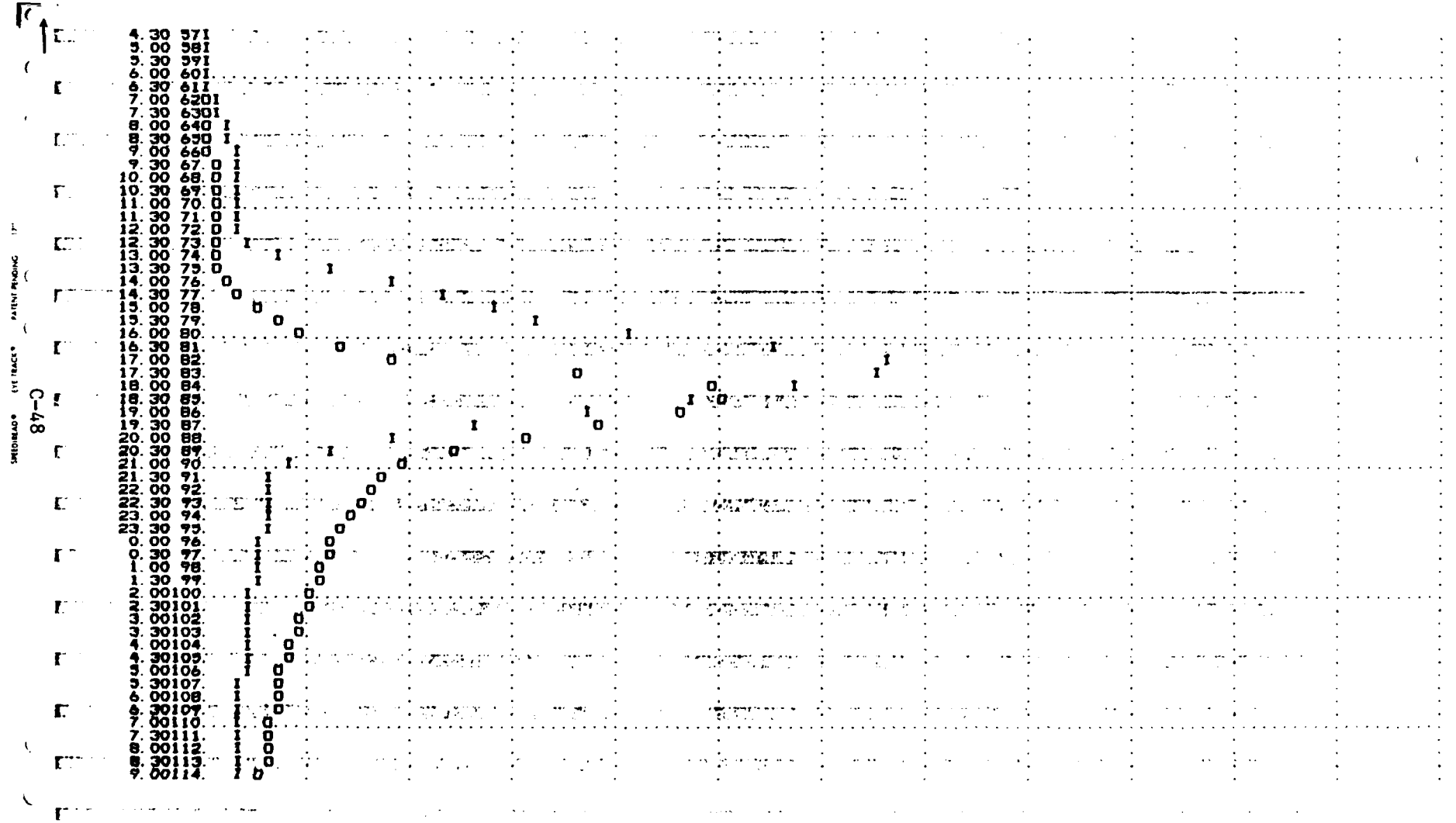
AD-A110 118 FLAHERTY-SIAVARA ASSOCIATES NEW HAVEN CT F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MOE POND DAM (INVENTORY NUMBER NY --ETC(U)
JUL 81 H C FLAHERTY DACW51-81-C-0006
UNCLASSIFIED NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	100.	200.	300.	400.	500.	600.	700.	0.	0.	0.	0.	0.
0.30	11												
1.00	21												
1.30	31												
2.00	41												
2.30	51												
3.00	61												
3.30	71												
4.00	81												
4.30	91												
5.00	101												
5.30	111												
6.00	121												
6.30	131												
7.00	141												
7.30	151												
8.00	161												
8.30	171												
9.00	181												
9.30	191												
10.00	201												
10.30	211												
11.00	221												
11.30	231												
12.00	241												
12.30	251												
13.00	261												
13.30	271												
14.00	281												
14.30	291												
15.00	301												
15.30	311												
16.00	321												
16.30	3301												
17.00	3401												
17.30	3501												
18.00	3601												
18.30	3701												
19.00	3801												
19.30	3901												
20.00	401												
20.30	411												
21.00	421												
21.30	431												
22.00	441												
22.30	451												
23.00	461												
23.30	471												
0.00	481												
0.30	491												
1.00	501												
1.30	511												
2.00	521												
2.30	531												
3.00	541												
3.30	551												
4.00	561												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5.00 381
5.30 391
6.00 401
6.30 411
7.00 6201
7.30 6301
8.00 640 I
8.30 650 I
9.00 660 I
9.30 67. O I
10.00 68. O I
10.30 69. O I
11.00 70. O I
11.30 71. O I
12.00 72. O I
12.30 73. O I
13.00 74. O
13.30 75. O
14.00 76. O
14.30 77. O
15.00 78. O
15.30 79. O
16.00 80. O
16.30 81. O
17.00 82. O
17.30 83. O
18.00 84. O
18.30 85. O
19.00 86. O
19.30 87. O
20.00 88. O
20.30 89. O
21.00 90. O
21.30 91. O
22.00 92. O
22.30 93. O
23.00 94. O
23.30 95. O
0.00 96. O
0.30 97. O
1.00 98. O
1.30 99. O
2.00100. O
2.30101. O
3.00102. O
3.30103. O
4.00104. O
4.30105. O
5.00106. O
5.30107. O
6.00108. O
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7.00110. O
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8.00112. O
8.30113. O
9.00114. O
SPEEDREAD® EYE TRACK® PATENT PENDING
C-48

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 9.30115.  I  O
10.00116.  I  O
10.30117.  I  O
11.00118.  I  O
11.30119.  I  O
12.00120.  I  O

*OVN*
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********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
				0.50	0.55	0.60	0.61	0.62	0.63	0.64	0.65	1.00
HYDROGRAPH AT	1	0.26	1	330.	363.	396.	403.	409.	416.	423.	429.	660.
		(0.67)		(9.35)(	10.28)(	11.22)(	11.41)(	11.59)(	11.78)(	11.97)(	12.15)(	18.70)
ROUTED TO	1	0.26	1	135.	153.	170.	173.	177.	182.	189.	197.	303.
		(0.67)		(3.82)(	4.32)(	4.81)(	4.91)(	5.01)(	5.15)(	5.36)(	5.58)(	14.26)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1630.00	1630.00	1632.50
STORAGE	0.	0.	94.
OUTFLOW	0.	0.	178.

RATIO OF PMF	MAXIMUM RESERVOIR W.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	1632.08	0.00	78.	135.	0.00	43.50	0.00
0.55	1632.25	0.00	85.	153.	0.00	43.50	0.00
0.60	1632.42	0.00	91.	170.	0.00	43.50	0.00
0.61	1632.45	0.00	93.	173.	0.00	43.50	0.00
0.62	1632.47	0.00	94.	177.	0.00	43.50	0.00
0.63	1632.52	0.02	95.	182.	1.00	43.50	0.00
0.64	1632.55	0.05	96.	189.	1.50	43.50	0.00
0.65	1632.58	0.08	97.	197.	1.50	43.50	0.00
1.00	1633.12	0.62	119.	303.	4.00	42.50	0.00

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************
```

APPENDIX D

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

PREVIOUS REPORTS

NYS LIC. NO. 36695LS

LEON KALMUS
Land Surveyor
418 CHESTNUT STREET
ONEONTA, N. Y. - 13820

PHONE 607-433-2300

CONSTRUCTION LAYOUT:
STREETS, HIGHWAYS
BUILDINGS
STRUCTURES

BOUNDARY SURVEYS
SUBDIVISION
TOPOGRAPHIC SURVEYS
CONTROL SURVEYS

February 28, 1968

Leatherstocking Corp.
19 Main Street
Cooperstown, N.Y. 13326

Att: Mr. Bruce Rathbone

Dear Mr. Rathbone:

This is to confirm our telephone conversation of this date regarding the area of Moe Pond.

ASCS photograph No. EHH, 1AA, 42, dated 5/27/60 was used to planimeter the area of Moe Pond. Two successive planimeter readings gave an area of 39 acres. The distortion in this photograph, which would tend to enlarge all objects, was estimated to be approximately 10%.

Therefore, the estimated surface area of Moe Pond was given to you as 35 acres more or less.

Very truly yours,

Leon Kalmus

LK/e

Leon Kalmus, L.S.

PREVIOUS INSPECTION REPORTS

GORDON H. REYNOLDS
PROFESSIONAL ENGR. AND LAND SURVEYOR
110 FAIR STREET
COOPERSTOWN, NEW YORK

PHONE XXXXX 547-9628

May 31, 1972

Leatherstocking Corporation
Cooperstown, N. Y. 13326

Attention: Mr. Bruce Rathbone

Re: Inspection of dam at Moe Pond

Dear Bruce:

The subject dam was inspected after the heavy rains on May 22, 1972. About 1 inch of water was flowing over the spillway. No seepage was noted at the toe of the dam.

A combination of high water and the lubrication of the soil under an earth fill dam caused by perculation of water can cause failure of an earth filled dam.

In the case of Moe Pond, heavy rains cause only a small increase in water level. This is because the pond is larger in comparison to the total drainage area. The water spreads out - not up. Further, the Moe Pond is surrounded by woodland. This condition slows down the run-off and thereby lessens the chance for a high water condition.

In view of the fact that perculation through the dam and high water condition do not exist during and after heavy rains, I conclude that the Moe Pond Dam is a very safe structure indeed.

Very truly yours,

G. H. Reynolds

Gordon H. Reynolds

GHR:mg

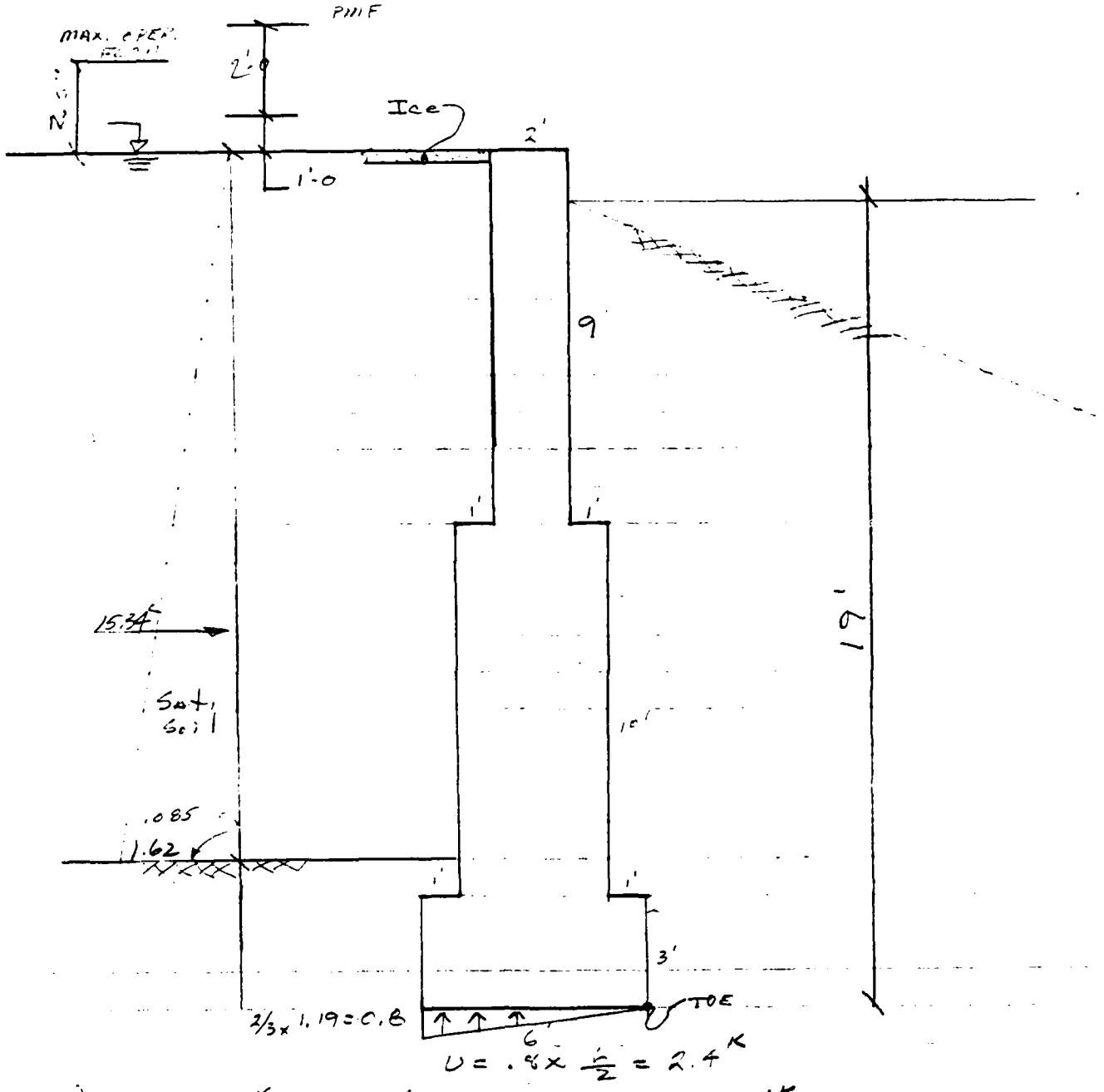
APPENDIX E

STRUCTURAL STABILITY ANALYSIS

PROJECT _____

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA NEW HAVEN CONN 06510/203/789-1260

SHEET NO. 1 OF _____
BY _____ DATE _____
CHK'D. BY _____ DATE _____



$U = .8 \times \frac{3}{2} = 2.4^K$

$P_{SAT} = 15.34^K \times \left(\frac{19}{3} + 9\right) = 158.5^{'K}$

$P_{WS_1} = 1 \times .0624 \times 1.9' = 1.19$ $\times \left(\frac{19}{2} + 4\right) = 16^{'K}$

$P_{WS_2} = 2.5' \times .0624 \times 19 = 3^K$ $\times$ " $= 40.5^{'K}$

$P_{WS_3} = 3.0' \times .0624 \times 19 = 3.56^K$ $\times$ " $= 48.06^{'K}$

$U = 2.4^K$ $\times$ 4' $= 9.6^{'K}$

Section	Wt.		Mom.
3 x 6 x .15 =	2.7 K	x 3' =	8.1 'K
4 x 10 x .15 =	6.0 K	x 3' =	18.0 'K
2 x 9' x .15 =	2.7 'K	x 3' =	8.1 'K
	11.4		34.2 'K

E-1

Loading Case: Normal

$F_H = 15.34^K + 1.19^K = 16.53^{K/FT}$

$M_{OT.} = 15.65 + 16 + 7.6 = 184.1^{'K}$

$M_{Resist} = 34.2^{'K}$

$F_1 = 11.4^K$

$F_p = .38^{K/S} =$ $\quad F_{Hp} = 19' \times .38 \times \frac{19}{2} = 68.6^K$

$M_{Rpp} = 68.6 \times \frac{19}{3} = 434.4^{'K}$

$F.S._{O.T.} = \frac{34.2 + 434.4}{184.1^{'K}} = 2.55$ OK

$F.S._{SL.} = \frac{(11.4 - 2.4).6 + 68.6}{16.53^K} = 4.48$ OK

Loading Case: Normal + Ice

$F_H = 16.53 + 5 = 21.53^{K/FT}$

$M_{OT} = 184.1 + 5 \times 22' = 294.1^{'K}$

$F.S._{O.T.} = \frac{468.6}{294.1} = 1.59$ Less than desirable

$F.S._{SL} = \frac{9 \times .6 + 68.6}{21.53} = 3.44$ OK

Earth embankments both sides provides stability. Loc. of res. N/A.

PROJECT

FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN 06510/203/789-1260

SHEET NO. 3 OF 5
BY FGA DATE 9-7-1
CHK'D. BY _____ DATE _____

Loading Case : Max Oper.

$F_H = 15.34^K + \text{[illegible]}^K = 18.3.2^K$

$M_{OT} = 158.5 + 40.5 = 199^{IK} + 9.6 = 209.6^{IK}$

$F_U =$ [illegible]
$F_{UP} = 2.4$
[illegible] $= .6$ $\quad F_{RESIST} =$ [illegible]

$$F.S.\ O.T. = \frac{468.6}{209.6} = 2.25\ OK$$

$$F.S.\ SL = \frac{54 + 68.6}{18.34} = 4.03\ OK.$$

Loading Case : P.M.F.
Ht. of water 3.0' above spillway
$F_H = 3.56 + 15.34 = 18.9^K$
$M_{OT} = 158.5 + 48.45 + 9.6 = 216.16^{IK}$

$$F.S.\ OT. = \frac{468.6}{216.16} = 2.17\ OK$$

$$F.S.\ SL. = \frac{(11.4 - 2.4)\ 7.6 + 68.6}{18.9} = 3.9\text{[illegible]}$$

Loc. of res. N/A

APPENDIX F

REFERENCES

REFERENCES

1. Chow, Ven Te, Editor - Handbook of Applied Hydrology. McGraw-Hill Book Company, New York, New York, 1964.

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3. Hydrologic Engineering Center, U.S. Army Corps of Engineers, Flood Hydrograph Package (HEC-1), Users Manual for Dam Safety Investigations, Davis, California, September 1978.

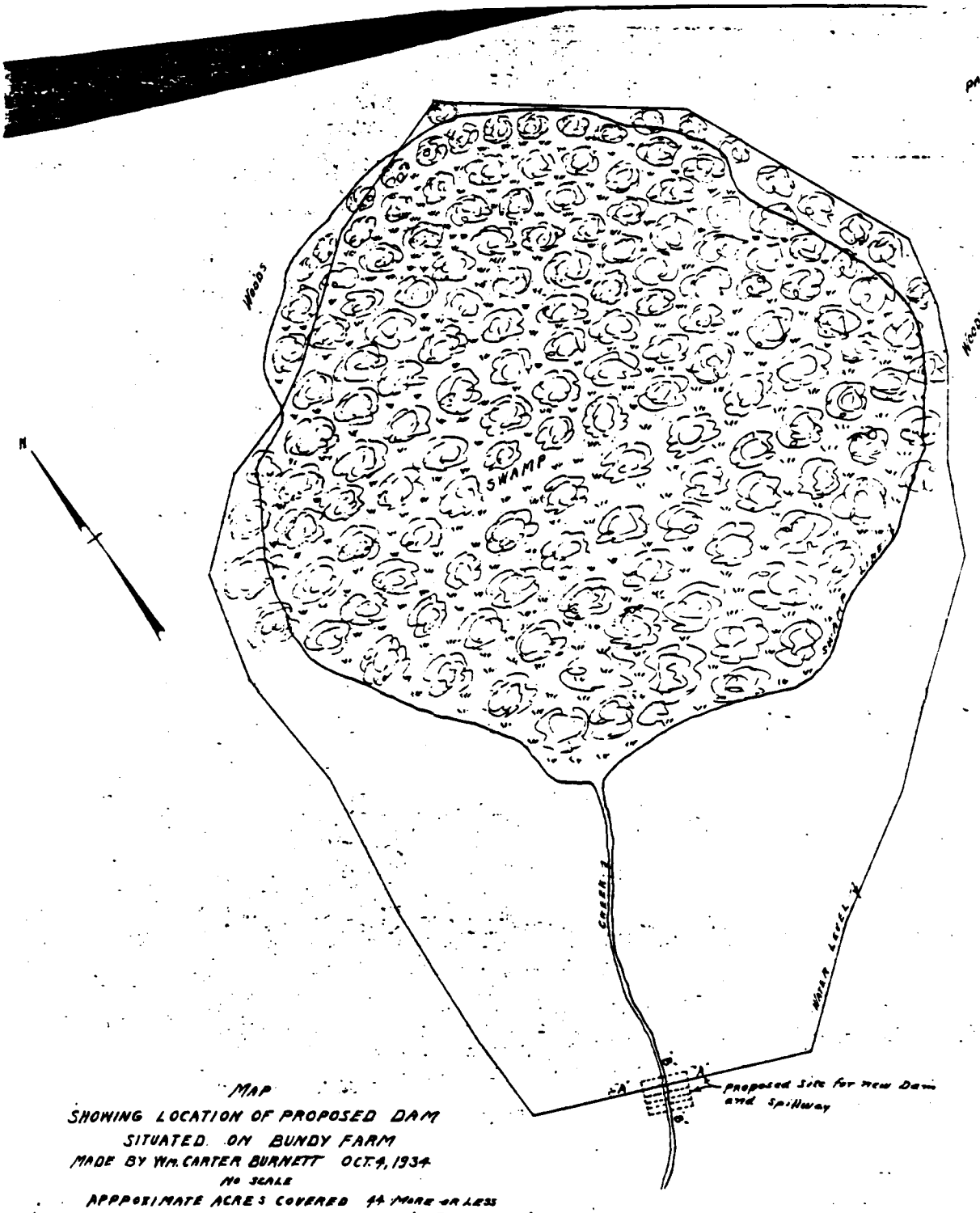
4. King, Horace and Brater, Ernest. Handbook of Hydraulics, 5th Edition. McGraw-Hill Book Company, New York, New York, 1963.

5. Riedel, J.T., Appleby, J.F. and Schloemer, R.W. Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1000 Square Miles and Durations of 6, 12, 24, and 48 Hours (Hydrometeorological Report No. 33) U.S. Department of Commerce - Weather Bureau and U.S. Department of the Army - Corps of Engineers, Washington, D.C., April 1956

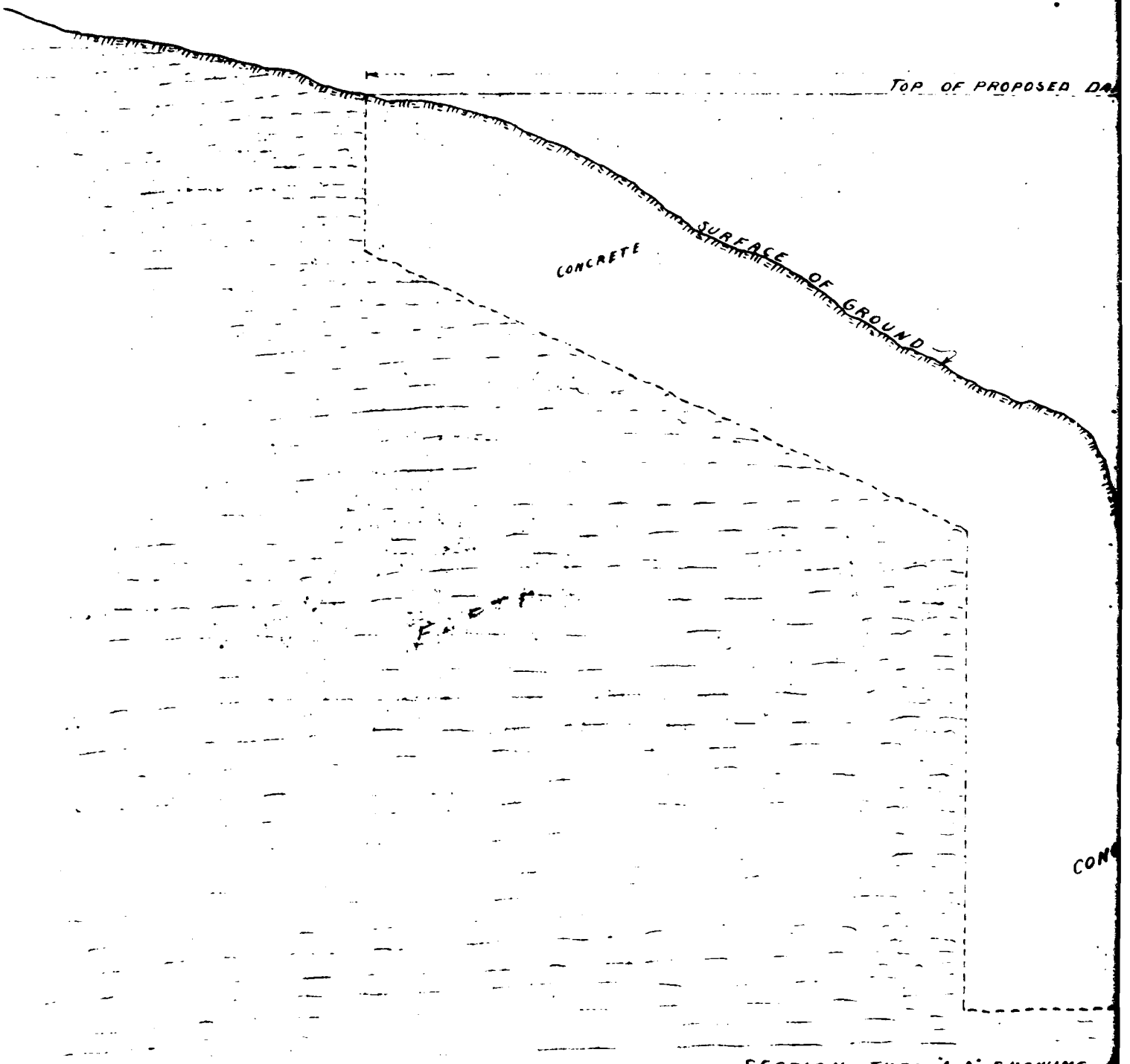
6. U.S. Department of the Interior, Bureau of Reclamation, Design of Small Dams, Second Edition, Washington, D.C., 1973.

APPENDIX G

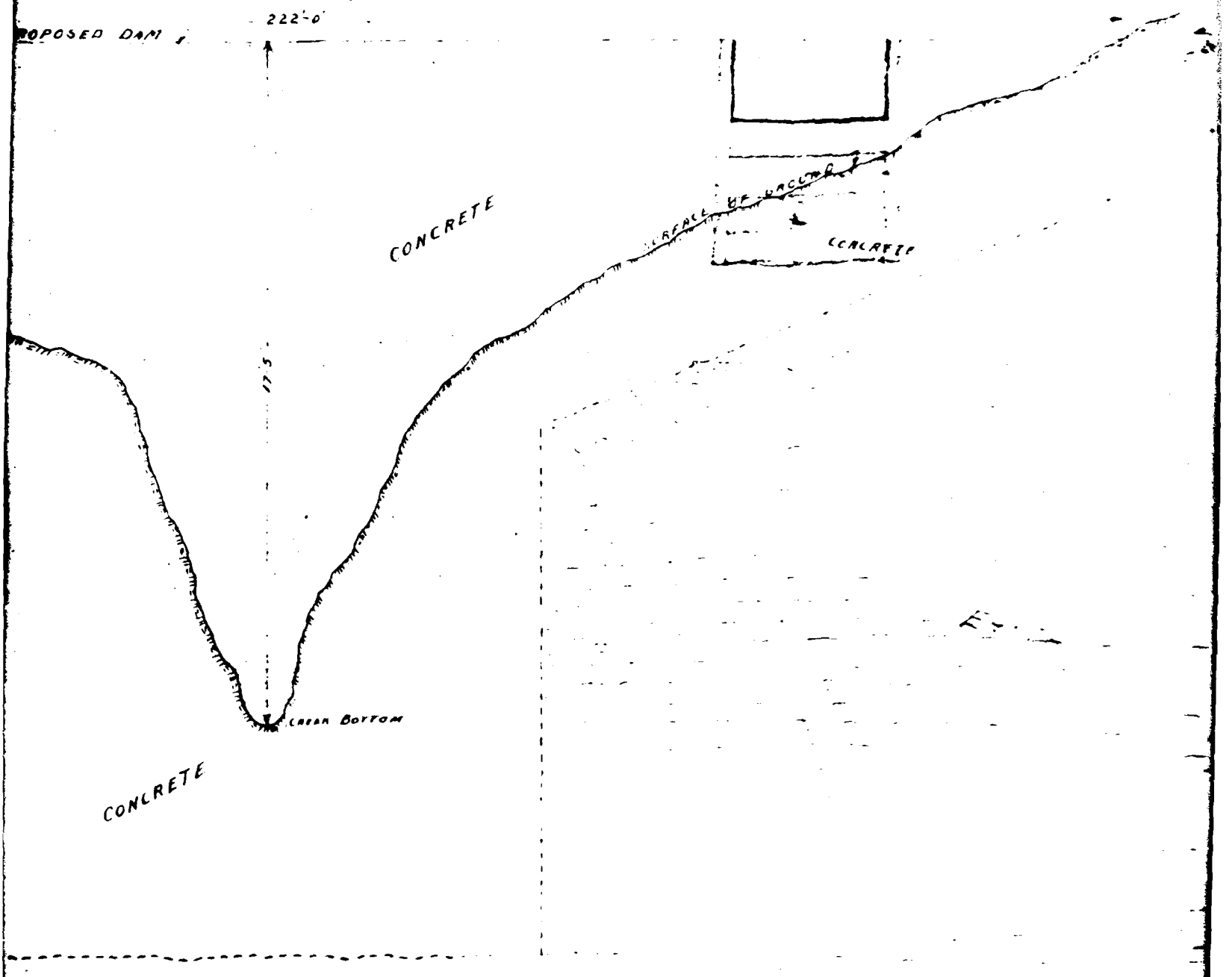
DRAWINGS



MAP
SHOWING LOCATION OF PROPOSED DAM
SITUATED ON BUNDY FARM
MADE BY Wm. CARTER BURNETT OCT. 9, 1934
NO SCALE
APPPOXIMATE ACRES COVERED 44 MORE OR LESS

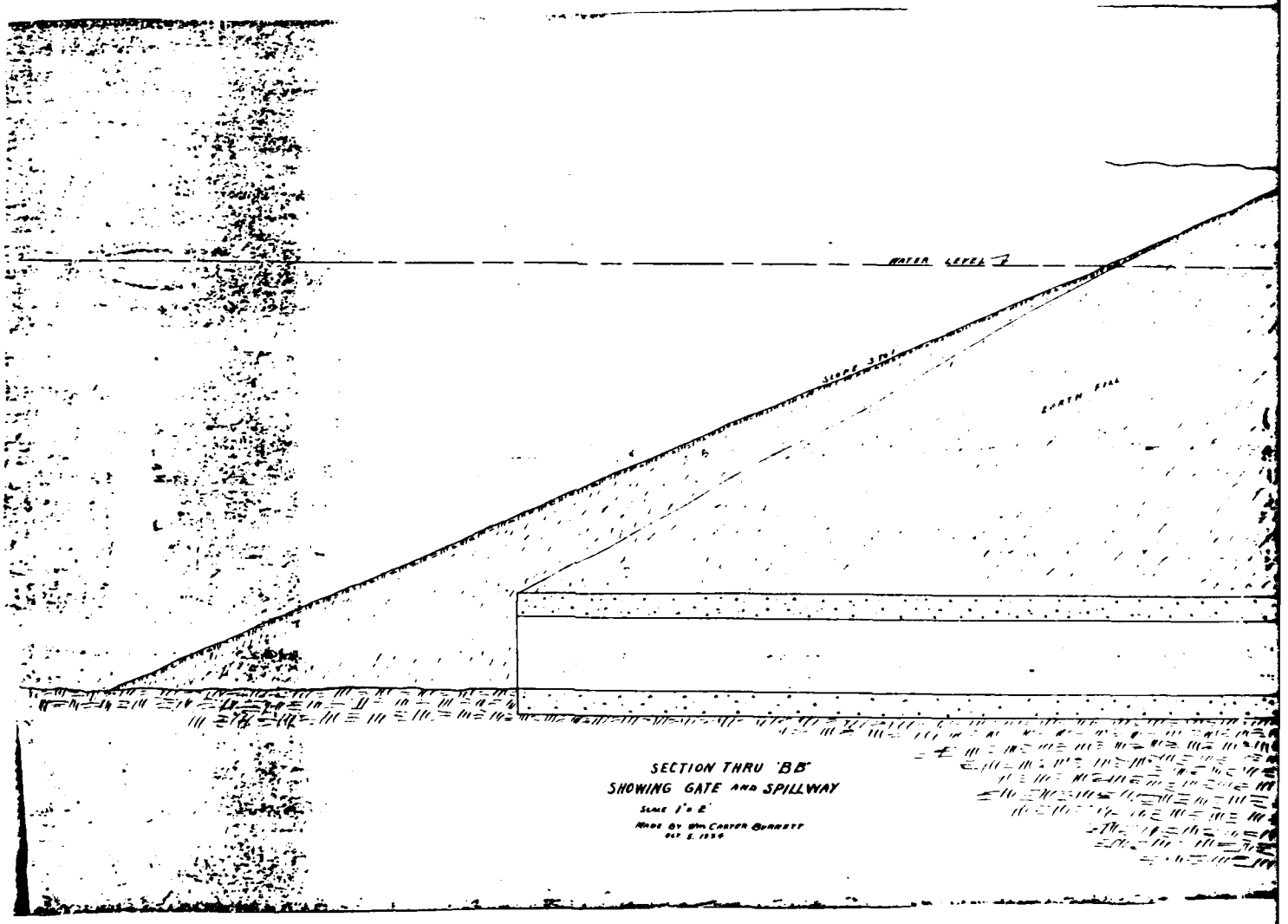


SECTION THRU 'A A' SHOWING
PROP



SHOWING PRESENT SURFACE OF GROUND AND HEIGHT OF PROPOSED DAM

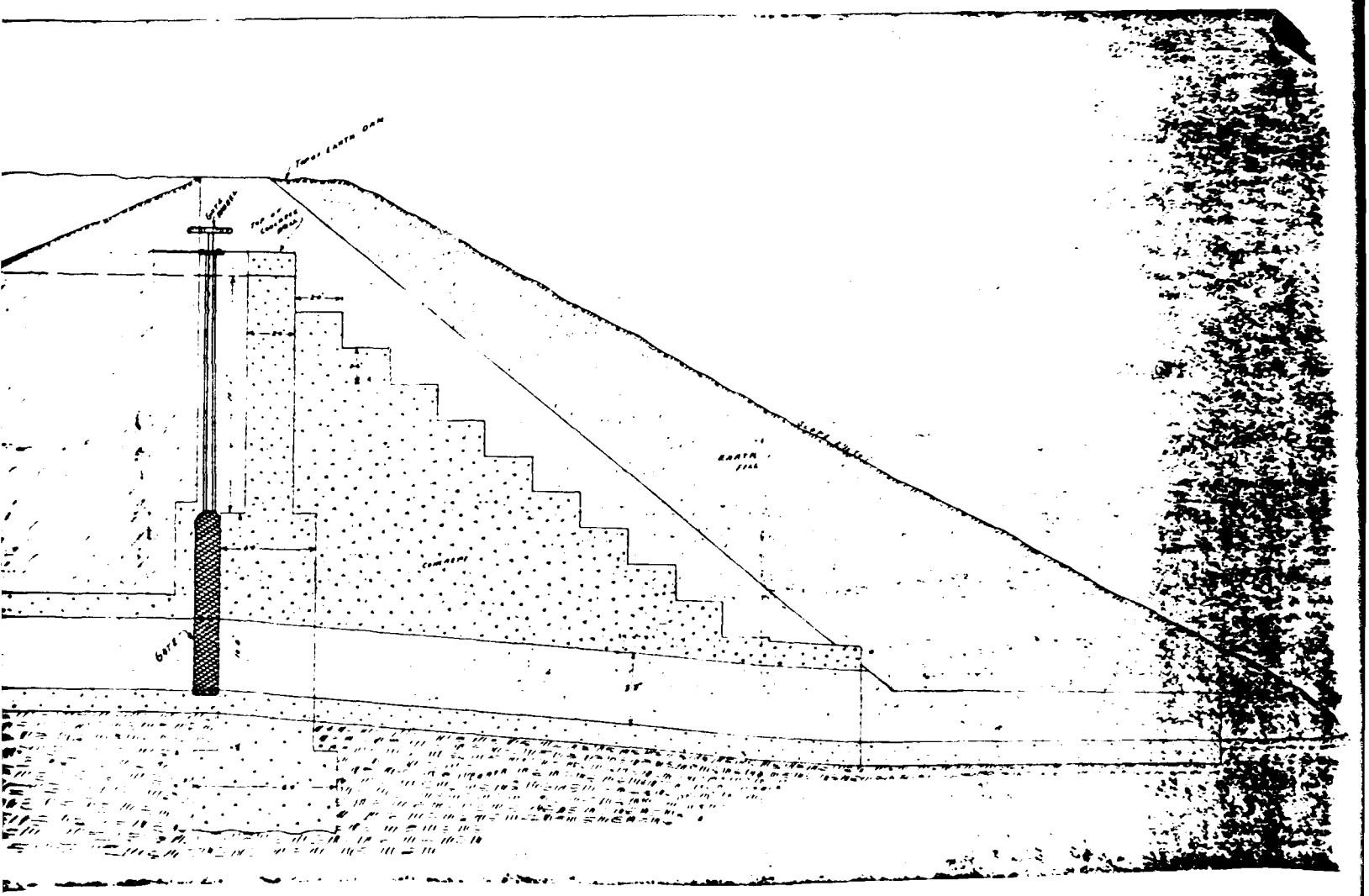
SCALE { HORIZONTAL 1" = 1'
VERTICAL 1" = 2'



SECTION THRU 'BB'
SHOWING GATE AND SPILLWAY

SCALE 1" = 2'

MADE BY Wm. CARTER BURNETT
OCT 5. 1934




FILMED
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